RAILROAD GAZETTE

FRIDAY, SEPTEMBER 23, 1898.

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The Roadmasters' Convention.

The sixteenth annual convention of the Roadmasters' Association of America was held in Denver, Sept. 13 and 14, President A. M. Hawkins (Supt. Norfolk & Southern), in the chair. More than 200 members and friends were present. In his opening address the President called attention to the extent of the property over which roadmasters have charge and the importance of the questions to be discussed during the convention. Mr. Burnett, the first President of the Association, was present, and made brief remarks. The report of the Secretary and Treasurer showed that there was on hand at the beginning of the year $729,.50, and that during the year $1,557.82 had been received in dues, advertisements, etc., making a total of $2,287.42. There had been expended during the year $1,523.40, leaving a balance on hand of $764.02. The secretary reported 23 applications for membership.

At this point Governor Alva Adams, of Colorado, delivered an address of welcome. He said that the first labor he had performed in Colorado was that of laying track on the Denver & Rio Grande. But he soon quit that work for a better job and has since been paying his fare on the railroads. He welcomed the delegates of the Association because they represnted the working classes, and not millionaires engaged in buying railroad stocks, bonds and Legislatures. Colorado is a child of the railroad, without which the mines could neither have been developed nor their products marketed. Passengers could now ride to Cripple Creek, the greatest mining camp in the world, in Pullman cars, and can make short trips among the mines by electric cars.

The convention next elected officers, as follows: President, T. Hickey (Mich. Cent.); First Vice-President, J. M. Meade (P. R. R.); Second Vice-President, Charles B. Teller (D. L. & G.); Secretary and Treasurer, J. B. Dickson (C. & N. W.).

A paper on "Discipline and Its Application to Track Forces," by H. W. Church (L. S. & M. S.), was then read by Secretary Dickson. An abstract of this paper was published in our last issue, p. 660. In the discussion, Roadmaster McClaren (Toledo & Ohio Central), said that the Brown system had been used on his road, being applied in the road department to foremen only. President Hawkins stated that the same system had been applied to trainmen on his road for several years and finally to foremen; the premium system had also been applied in connection with it. He approved of the system and thought Mr. Church's points were well taken. He believed the system was destined to spread widely over the country. Mr. H. B. Dick (Zanesville & Ohio River) said the system had been tried on his road for two years, being applied to all the track forces, including section hands.

On Tuesday afternoon the first order of business was the consideration of an amendment proposing to change the name of the Association to the "Railway Maintenance of Way Association," but the proposition was lost by a vote of 24 yeas to 45 noes. Amendments to the constitution were then passed, empowering active members who are elected to honorary membership to retain all the rights of active membership, and giving associate members the privileges of the floor only on invitation from the presiding officer; they shall not have the right to vote or hold office.

A report on "Best Method of Preventing Creeping Rails" was read by Mr. Coates. This report was adopted as a whole. An abstract of the same was given in our last issue. In the discussion on this report, Mr. Hickey (Mich. Cent.) said that on a stretch of track over low ground, laid with broken joints, 44-in. angle bars with 12-in. gravel ballast, trouble was had by rail creeping, the inside rail of curves creeping the farthest; it had frequently been found necessary to pull the outside rail back 2 ft. and swing the joint ties around. The trouble was overcome by the use of anchor splices at the middle of the rail, halves of broken splices being used. These were bolted to the inside rail only, but the creeping of both rails was stopped and no trouble has since arisen.

Mr. J. D. Perry had considerable trouble on a four-mile grade, where the joints pulled apart near the top of the grade and the whole string of rails ran down hill, the joints sometimes pulling apart as much as four or five in. in one night, making it necessary to keep a watchman at the place to warn the trains. The trouble was overcome by tightening the bolts during the heat of the day while the rails were expanded, and in keeping the bolts well tightened thereafter. No trouble from rail creeping has occurred at that point since. On a trestle one mile long he had overcome rail creeping by slot-spiking each joint-splice with six spikes and lag-bolting the guard rail to the ties. The ties were lapped over the stringers, but not spiked or drift-bolted to the same.

Mr. Coates (N. Y., N. H. & H.) had very much decreased rail creeping by using anchor splices at the middle of the rail. These were made by cutting old four-bolt angle bars into four pieces, retaining one bolt hole in each. On stone ballast (double track road), he drives the outside spikes on the receiving side of the tie and the inside spike on the leaving side. In tamping he tamps first on the receiving side and last and hardest on the leaving side.

Mr. Sullivan (Mich. Cent.) said that eight years ago he had had much trouble with a stretch of a mile and a half of track over a marsh, laid with 60-lb. rails. The track had crept as much as 10 ft. in one season, and a wreck had been caused by the buckling of the rails while creeping. The trouble was overcome by putting 18 in. of cinder ballast under the ties, widening the shoulders and laying a 65-lb. rail. There has been no trouble since these changes were made.

Mr. McQuade (Boston & Albany) thought rail creeping was principally due to poor ballast and light rails. He had been able to prevent rail creeping in a measure by bolting anchor plates to the middle of the rail and placing blocks between the ties ahead of the anchor plate.

Mr. Daugherty (Ill. Cent.) had found that rail creeping could be stopped by slot spiking 40-in. angle bars on three ties where 20-in. angle bars slot-spiked on only two ties could not. Mr. Jones (C., B. & Q.), believed that except in extreme cases the secret of preventing creeping lay in having perfect track, perfect ballast, ties, splices and spiking. On a trestle where the rail had crept 3½ ft. in three months he had overcome the trouble by the use of anchor rods at five points; these rods were attached to the rail and anchored to the earth. A number thought that the use of a heavier rail would solve the difficulty in nearly all cases.

Mr. Connor (U. P.), had found that no amount of slot spiking 56 and 60-lb. rails on mud ballast track could prevent creeping, whereas the same provision with 70-lb. rails had so far prevented the creeping that no trouble was had on tracks still remaining in mud ballast.

The remedy applied by Mr. Foley (Mich. Cent.) was the use of 44-in. angle bars, slot-spiked, the spikes driven tightly to the rail every season; the rail used is 80 lbs. per yard.

The convention next took up the report on tie plates, submitted by W. J. Prindle, J. L. Single, Henry Ware and Edward Marshall. After a discussion of the seven recommendations of the committee, the report was adopted as a whole. This report is very thorough. The seven recommendations of the committee will be found in the article on the tie-plate report, printed below.

On Wednesday morning the convention was opened at 9.30 by prayer by the Rev. John Brunton, Chaplain of the Denver & Rio Grande Railroad. At this time the register showed that 307 members, friends and supply men were in Denver. The first discussion was on track joints. Mr. Hickey (Mich. Cent.), showed a sample joint splice designed by Chief Engineer A. Torrey of that road. This splice consists of the ordinary angle bars with a piece of rail about 12 in. long inverted and placed base to base with the track rails, under the joints. Two U-bolts are then passed around the short piece of rail and secured through holes in the rail base, thus firmly splicing the short piece of rail against the track rails at the joint. Last year 60 miles of old sawed rails were laid and spliced with this joint, and the satisfaction given has been such it has been adopted as the standard splice of the road. Eighteen miles of track laid with 80-lb. rails has lately been spliced with this device. The total cost is 85 cents, and it is not patented. Two months ago 33 miles of track on the Michigan Central's air line was spliced with this device.

The next subject was long rails and miter cut ends. On this subject there was both a majority and minority report (see last week, p. 660). The minority report was accepted and the convention then proceeded to discuss that paragraph of the minority report which recommends the use of 60-ft. rails. In this discussion there were few present who were able to talk from actual experience with rails longer than 30 ft., or with rails having miter-cut ends. Mr. Douglass (C. & O.), had laid two miles of 60-ft. square-cut rails 2½ years ago, and four miles of the same 16 months ago. Both cases gave satisfaction, and no trouble developed from contraction of the rails in winter. Mr. Coates had inspected the 45-ft. miter-cut rails on the Lehigh Valley, and the 60-ft. rails on the Pennsylvania. He found the chief difficulty with these rails to be the crooked, or kinked condition in which they were sent out from the mills. On the Lehigh Valley the rails occasionally break at the first bolt hole. He thought the expense of unloading 60-ft. rails not a serious matter. On his road, the N. Y., H. & H., 100-lb. 30-ft. rails are unloaded by a derrick in which the mast is a rail and a piece of 1½-in. gas pipe is used for a boom. Two of these derricks are used at each car unloaded. There are sliding clamps on the mast, one of which engages the edge of the side of the car and the other the side sill under the car body. With this device six men unload the rails at the rate of about one each minute.

The discussion then turned upon the question of expansion allowance for long rails. Mr. Merrell (C., M. & St. P.), had found heavy rails to require a less allowance for expansion than light; this he explained by the fact that the heavy mass of metal is more slowly affected by a change of temperature and can be compressed more without buckling for the reason that the heavy rail is stronger considered as a column. Mr. Dunn (Atlantic Coast Line), concurred with Mr. Merrell. Mr. Spencer (C. & N. W.), had observed the expansion of 50, 60, 65 and 70-lb. rails and found that the 50-lb. rail generally expanded more than those weighing 65 and 72 lbs. per yard.

The opposing views, as expressed in the majority and minority reports, led to considerable spirited discussion. Mr. Ware (B., R. & P.) said that four years ago he had laid 11 miles of miter-cut 45-ft. rails on his road upon the recommendation of Mr. Caffrey of the Lehigh Valley. These rails had been giving good satisfaction, the only trouble having been caused by the crooked condition of the rails when first received. He was at loss to understand why Mr. Caffrey had changed his former views. Mr. Meade (A., T. & S. F.), agreed with the minority of the committee and thought their report should be adopted. On motion of Mr. Jones, however, both reports were received as information and the matter continued for the consideration of the Association until next year.

The report on "Widening Gage on Curves" was read by Mr. Coates, after which it was accepted and opened for discussion. Owing to the length of this report, we are obliged to defer its publication.

In discussion Mr. Brenton (Colo. Midland), said that he had charge of 500 curves of all degrees up to 16. He had formerly widened the gage of 16-degree curves 1 in., but had constant trouble in keeping the curves in line. During the last two years he had changed all the curves to standard gage, no rail braces being used. He has had no trouble with his curves since the change and is enabled to keep them in much better line. He explains the tendency of the curves of widened gage to get out of alignment by the increased pressure of wheels against the outer rail. He has laid a curve of 16° 40′ to close gage with splendid results. Consolidated locomotives with a 15-ft. rigid wheel base are used. Mr. McClaren (T. & O. Cent.), thought that the gage should be widened on all 16° curves.

Mr. Dunn then stated that he thought the ruling locomotive for widening gage on curves was the eight-wheel passenger. Moguls and consolidation give far less trouble on curves. Several members then complained of abnormal wear of the outside rail of curve. Messrs. Craiglow (St. L. & I.), and Fisher (M., K. & T.), thought that the gage of the track had nothing to do with the wear of the rails. Mr. Ware, who has charge of 230 curves in 100 miles of track, formerly thought that the gage should be widened on curves, but after experimenting, had concluded that such is not necessary. On a particular 7-degree curve where the gage was widened, he had had considerable trouble from cutting the outside rail. About a year ago he relaid the curve with new rail laid to close gage, using tie-plates on oak ties. Since the change he had found that the rail had ceased to wear an unusual amount, which he explained by the fact that on close gage car trucks run more nearly in a position parallel with the track, whereas if the gage is widened the truck will slew to a diagonal position, thus permitting the wheels to grind harder against the outside rail. The observations of Mr. Daugherty (Ill. Cent.), coincided with those of Mr. Ware.

Mr. Morrison, formerly Roadmaster on the Lehigh Valley, stated that several years ago he had looked into the matter of widening gage on curves and finally disposed of the matter as follows: He procured from the Master Mechanic the plans of all the types of locomotives used on the road and from these calculated the maximum curvature to which each could adapt itself without widening the gage; in this he found a considerable variation and concluded that the matter of widening gage on curve was purely a question of

locomotive wheel base. He thought the disagreement between roadmasters on the question of widening gage was due entirely to the fact that different types of locomotives are in use on the various roads represented. Messrs. Dick, Hawkins and Lahey concurred with Mr. Morrison.

The report of the committee was accepted as read.

At the second session of Wednesday the report on Frogs and Switches was read. Mr. Merrell did not think grooving the spring rail necessary, but Mr. Clark (P. & R.) said he knew of two serious accidents occasioned by the spreading of the wing rail by badly worn flanges and considered grooving this rail absolutely necessary for safety. Mr. Fisher (M., K. & T.) thought that not so much danger lay in worn flanges as in the frog itself after it has become worn from service, in which case even a slightly worn wheel flange will spread the spring rail; he therefore favors grooving this rail. Another member said that a low joint at the toe of the frog will cause the heel of the spring rail to flop up when a wheel passes a joint, and therefore he favors grooving the rail at the point recommended by the committee.

Mr. Coates said that the method of arranging the frog spring by placing a bolt across the mouth of the frog is questionable, since in case of derailment the bolt is sure to become bent. Mr. Dunn concurred with Mr. Coates, and said he had known frog springs to be so stiff that empty box cars were unable to spread the wing and were derailed. Upon motion of Messrs. Coates and Dunn recommendation 4 of the report was amended so as to specify a spring inclosed in a box near the heel of the spring rail, this spring to be made adjustable. Recommendation 6 was amended in the second line so as to read: "Should be provided with a heel riser of steel run back far enough," etc.

With the exception of these two amendments all the recommendations in this report were adopted as they stand.

In the discussion on switches Mr. Coates thought there should be an anchor plate at the heel of the split rail to hold it at its proper distance from the stock rail. Mr. Clark agreed with Mr. Coates, and said that where no special device had been provided he had sometimes used pieces of gas pipe as collars on bolts reaching through both rails, so as to maintain them at a proper distance apart. Mr. Dickson said he had tried devices of the kind mentioned and had some in the track at present which he would gladly remove if permitted to do so. He found that the rails in creeping throw the joint out of line. Mr. Coates said he had used a tie-plate with seats at proper intervals for the two rails, so that the rails were permitted to creep over the plate unhindered, but were maintained at the proper distance apart.

Detroit, Mich., was chosen as the place of the next convention. A committee consisting of Messrs. Dunn, Emery and Daugherty submitted the resolutions on the deaths of E. Haley and F. M. Sargeant, members of the Association who had died during the past year. It seems that the Secretary had not been notified of these deaths.

Exhibits.

The Adams & Westlake Co., Chicago.—Signal lamps, switch lamps, semaphore lamps and train order signals.

Automatic Rail Joint Spring Co., Chicago.—Rail joint spring for locking bolt and taking up wear automatically of rail joints.

M. M. Buck Mfg. Co., St. Louis, Mo.—Switch lamps, cycle hand cars, metal track flags, track drills, shovels and shovel handles, tamping and pinch bars, rail saws, chain surface cattle guard.

Buda Foundry & Mfg. Co., Harvey, Ill.—Steel wheels, steel-wheel hand cars, Paulus track drills, Buda track drills, railroad velocipedes, track gages, angle-bar straightener and bender, switch stands, model of Ramapo switch and stand, tie-plate surfacer and gage.

A. Bonzano, Philadelphia, Pa.—Bonzano patent rail-joint and anti-creeper.

Continuous Rail Joint Co. of America, Newark, N. J.—Samples of continuous rail joints.

Coughlin-Sanford Switch Co., New York.—Models and photographs showing the Coughlin swing rail frog.

Diamond State Iron Co., Wilmington, Del.—Churchill rail joints and new diamond spike.

Dilworth, Porter & Co., Pittsburgh, Pa.—Goldie projection tie plates with triangular claws; Goldie plate imbedded in cedar block, showing condition of fiber surrounding claws; samples of standard spikes with plain and Goldie points, samples of same imbedded in cedar blocks, showing condition of fiber adjoining spikes; Goldie girder tie-plate.

The Eyeless Tool Co., New York.—Eyeless picks and full line of track tools.

Elliot Frog & Switch Co., East St. Louis, Ill.—Three-throw split switch, Hasty switch stand, Eureka spring-rail frog with anchor block and Eureka spring-rail frog with plate; clamp frogs.

Fairbanks, Morse & Co., Chicago, Ill.—Nos. 1, 14 and 16 velocipede cars, Sheffield improved track tools, gages and levels, pressed steel track gages, Sheffield gasoline motor car, Barrett jacks, Sheffield pressed steel foot guard, steel surface cattle guards.

William Goldie, Jr., & Co., Pittsburgh, Pa.—Goldie Perfect spike plug.

Hussey, Binns & Co., Pittsburgh, Pa.—Track shovels.

The McMullen Woven Wire Fence Co., Chicago, Ill.—Samples of different styles of railroad fencing, models of same.

Mathews Woven Wire Fence Co., Jacksonville, Ill.—Woven wire steel fencing, steel fence posts and steel signal posts with sewer-pipe base, steel fence gates, foundation for interlocking switches.

A. O. Norton, Boston, Mass.—Sure-drop track jacks, automatic raising and lowering jacks, ball-bearing bridge and railroad jacks.

The National Lock Washer Co., Newark, N. J.—Lock washers, samples showing nut locked on bolt by washers, and still retaining its spring power.

Pennsylvania Steel Co., Steelton, Pa.—Models of frogs and switches and patent switch stands.

Page Woven Wire Fence Co., Adrian, Mich.—Models of Page woven wire fence.

Q & C Co., Chicago, Ill.—Ratchet jacks for track work, friction jacks, "Bryant" rail saw, Servis tie-plates, device for seating tie-plates.

Railroad Supply Co., Chicago, Ill.—The Chicago crossing signal, Wolhaupter tie-plate, Wolhaupter cattle guard.

Ramapo Iron Works, Hilburn, N. Y.—Model switch and stand, adjustable crank to fit throw of any switch.

Railroad Signal Lamp & Lantern Co., New York.—Full line of signal lanterns and lamps.

Roberts, Throp & Co., Three Rivers, Mich.—Models of hand cars.

Standard Coupling Co., New York.—The Wayland Insulating rail joint.

Henry Ware & Son, Springville, N. Y.—Tie-plate surfacer and gage.

The Weber Rail Joint & Mfg. Co., Newark, N. J.—Weber standard rail joints, insulating and step joints.

Andrew Warren Railway Supply Co., St. Louis, Mo.—No. 6 self-feeding track drill, improved Beland track drill, the Warren track drill and circular track gage.

Tie Plates.

At the convention of the Road Masters' Association of America at Denver, one of the valuable reports was that presented by Messrs. W. J. Prindle, J. L. Single, Henry Ware and Edward Marshall. The report contains certain recommendations; a description with illustrations of the various principal tie plates patented from 1871 to date; a theoretical discussion of the uses of the tie plate; a synopsis of the replies received to a circular of inquiries and a number of engravings, from photographs, of ties and tie plates as taken from the track. We can reproduce only a comparatively small part of this report, and the reader must understand that what follows consists of extracts only, and does not do complete justice to the study made by the committee.

Considering the cases which have come under the personal observation of this committee in connection with the answers to inquiries which we have sent out to many experienced railroad men who have used the various types of tie plates, we submit recommendations as to the general construction and use of tie plates, together with the facts and general information from which we have drawn these recommendations:

Recommendations.

First—That tie plates be used always in preference to rail braces for greater safety and higher economy.

Second—That tie plates be used on all ties where the life of the tie is limited by the cutting or sawing action of the rail.

Third—That tie plates be used on all ties whose life is limited on account of the destruction caused by spike killing.

Fourth—That tie plates with soft ties be used in preference to hard ties without any plates, when the natural life of the soft tie is equal to or greater than the natural life of the hard tie, cost being equal.

Fifth—That the only plate used be one which becomes practically part of the tie.

Sixth—That as a tie plate is intended to prevent the cutting action of the rail flange across the wood fibers of the tie, the plate used should not itself cut such fibers and should prevent the rail from cutting them.

Seventh—That a tie plate having sufficient thickness to resist buckling, sand wear and rust, during the natural life of the tie, should be used.

We received a report from only one supervisor who had all of the different types of plates in use, but as this supervisor has nearly three-fourths of a million plates of the different kinds in use, about half of them having flanges across the grain of the wood and the other half with flanges parallel with the grain of the wood, and "has been using plates for the last six years," and as he has been studying them with care, his report is of great value. These plates were used on "yellow pine, chestnut and cedar ties," and he "drives them home with a heavy sledge," and says the cost of application varies from three-eighths to nine-sixteenths cents per plate. The plates are all used under the same kind of traffic and on curves "from two degrees up," and on "every tie on curves." They do not move longitudinally. His experience is that the plate which lengthens the life of the tie most "is the one with longitudinal flanges." Under "remarks" he states that at some curves where it was necessary to roll the rail and regage the track each year, "since plates have been put on these curves they have been kept in perfect gage, and it has not been necessary to roll the rail in the last two years, and the rail lays perfect at the present time." "I have just as good results without a shoulder as with one. A plate with a longitudinal flange adheres to a tie better than one which cuts across the grain." In addition to this report he writes further as follows:

"I have had experience with the plates for the last six years under almost all conditions, and have found that most of the talk about the spike shearing when it is not protected with a shoulder, is all nonsense. I find that if you keep the rails level so that they conform to the wheel tread there will be no spread track, with or without shoulders. I have found that a tie plate will lengthen the life of yellow pine ties from two to three years, and cedar and chestnut from three to five years. On curves where fast and slow trains are run the tie plate will double the life of any kind of a tie, and when plates are properly applied they will stop the rolling of the rail, thus saving the adzing of ties to roll rail to gage and level. The plate should be so formed that the track can be shimmed without removing the plate. It should not be removed until the tie or rail is changed. I find that the plate with longitudinal flange adheres to the tie better than plates which cut across the grain. It should be formed so that it will adhere to the tie and become part of the same without injuring the fibers of the wood, and, when once applied, should not become loose and rattle At the present time I have found none but the ones with longitudinal flanges would adhere closely to the tie after they have been in track for a few years. The others will adhere to the tie for a short time, but will soon become loose and rattle."

He also writes relative to plates used in a large yard, "that these plates have been in track for eight months and have saved one set of ties. Before we used plates on this track it was necessary to renew the ties once every year, and some of them every six months." "The cause of ties cutting out so fast is on account of the yard being damp and quite a lot of sand being used. Since tie plates have been used in this track the ties are good for three or four years. This is one of the cases where plates pay if they wear out every six months, but the longer they last the better they pay."

A division engineer who has used plates of the Servis, Wolhaupter and Goldie pattern used them on every tie on curves of six degrees and over, and at road crossings, and they are under the same kind of traffic. The ties are white oak. It costs him between 1¼ and 2 cents to apply these plates, and he finds they do not move longitudinally and "he has not noticed any difference to amount to anything," as to which kind lengthens the life of the tie most.

A roadmaster who is using Servis and Goldie tie plates reports as follows: He uses them on white rock oak bridge ties only, and drives them into the wood with a 12-lb. sledge, which costs "about 1 cent per plate." They are used "on every bridge tie," and "do not move longitudinally." He finds that the labor saved is about 50 per cent., and says that he considers the Goldie lengthens the life of the tie most and gives better service than the Servis. The latter buckles.

An old, experienced roadmaster, who has about 70,000 Servis plates in track, has used them on "2½° with oak, on cedar switch sets, and on center joint ties, where three ties are used." He applies them "by the aid of Ware's tie plate surfacer and gage," and cost of applying is ½ cent in ties out of track and less than 1 cent when ties are in track. Oak ties used in both cases. He uses them on every tie, and finds they do not move longitudinally, and does not know which plate lengthens the life of the tie most. Under "remarks" he says: "Having had 45,000 in use since 1892, on oak ties and on curves of 5° to 7½°, have not had to regage any part of it. The surface of the plates has not gone below the surface of the tie, and work of surfacing and regaging, caused by the rail cutting into the ties, has been entirely eliminated by their use. As an element of safety they are invaluable."

A division roadmaster, who is using the Wolhaupter and Servis plates, reports as follows: He has used these plates on white oak ties, on curves, since 1893-4, and he applies them by "pulling the spikes on every other tie, adzing the tie, and then drive the plate under the rail, which partly beds the plate in the tie. After trains pass over I go back and apply them on the other ties." He says: "I have had no trouble with them moving longitudinally." As to which lengthens the life of the tie most, he says: "The Wolhaupter arch and girder will give the best satisfaction. The Servis plates I have in use buckle. I have used the plates on 5°, 6°, 7°, 8° and 10° curves. Before I put plates on these curves I had to adze the ties and regage the track once a year. Cost of doing this work, about 2 cents per tie. I have had tie plates on part of these curves for the last four or five years, and have not had to regage the track since the plates were put in. Before using the plates on these curves the ties would last four to five years, but by using plates we can get the full life of the tie, eight and nine years."

A railroad man who has a few of both Goldie and Servis plates in use on oak and pine ties, on joints only, states that they do not move longitudinally; that he prefers the Goldie, and that he finds considerable labor saved in the course of a year in respiking, adzing, etc.

Another roadmaster who is using a few of the Goldie and quite a number of the Servis, says he uses them on every tie, white oak, and on curves from 3° to 7°. The average cost to apply, "about 4 cents per tie, when we have 20 to 30 trains in working hours for the Servis, and half that price for the Goldie." They do not move longitudinally "until the life of the tie is about gone." As to lengthening the life of the tie, "both kinds on a curve give longer life to a tie; neither kind will lengthen the life of a white oak tie on tangent." Under "remarks" he says: "The Goldie is a good, strong tie plate, but will get loose on the tie sooner than the Servis, but the life of the Goldie will be much longer than the Servis. On a 3° curve and over, one-third labor is saved when the curve is well plated, and the curve is safe. Our trains make 60 miles per hour on these curves. We use them under 80-lb. rail; 5-in. base. Have used Servis plates seven years. Like the last style of pattern best; it has a good outside lug that saves track spikes, and it does not crack. All plates will buckle when placed on poor ties."

An engineer, M. of W. of a large traffic line, which has been one of the most extensive users of tie plates for years, writes: "We have been using Servis tie plates for several years past. * * * A great saving in the cost of tie renewals, and consequently in the expense of track maintenance, will be secured by their use. The kind of ties particularly used by us are redwood, the natural life of which (under heavy traffic) is seven years. With the use of tie plates we hope to at least double this period."

A superintendent, who has had extensive experience with the use of different kinds of tie plates, writes: "I am of the impression, however, that the Wolhaupter plates and well treated ties, with chloride of zinc solution, should give at least 30 per cent. of increase in life."

A Rail Joint Committee.

The letter ballot on the appointment of a committee of the American Society of Civil Engineers, to report on rail joints, is now before that body. The report of the Board of Direction presented to the Annual Convention, July 27, 1898, follows:

At the annual meeting of the Society, held on the 19th of January, 1898, it was

"Resolved, That it is the sense of this meeting that a special committee be appointed to consider the subject of Rail Joints for Standard Steam Railroads, and to report to the Society certain types of joints for discussion and consideration, and that this subject be referred to the Board of Direction for action."

This resolution evidently does not call on the Board to formulate any conclusions, but merely to collect

information to be laid before the Society for discussion by it.

In 1885 a special committee was appointed to consider the "Proper Relation to Each Other of the Sections of Railway Wheels and Rails." This committee made its final report to the Society in June, 1889. In January, 1890, a committee was appointed to report on the question of standard rail sections, and finally reported August 2, 1893, a set of sections which have become generally recognized standards throughout the United States. It would seem fitting that the work of these committees should be continued, and that a standard joint, or at least a standard section of angle bar, be adopted to go with the standard rail. Such a result, if obtainable, is worth striving for.

The questions, however, of standard rails and standard joints are not exactly analogous. In the matter of rails, the various fantastic sections had, through experience, become obsolete. Even the double-headed rail had in American practice disappeared, and the rails in actual service were all in one type, differing only in the manner of details, which could be reconciled. In the matter of joints we have not advanced so far. Fantastic devices are still in vogue, receiving much support, and experience has not yet finally evolved a surviving type. If the work of these committees required eight years, it can readily be seen the amount of labor that would be before a committee undertaking similar work for rail joints.

Your Board is, therefore, of the opinion that it would not be wise and practicable to consider the question of rail joints without some limitation thereon. Your Board, however, would recommend in favor of the appointment of a special committee to report to the Society upon the proper sections of angle bars to be used in connection with standard rail sections recommended by the former committee of the Society. It believes this would be a step in the right direction, as only a small number of railroads in this country use special joints, the main point of difference in the angle joints used being in the section, length and the drilling of the bars. There is such a wide variation in regard to the proper length and drilling of angle bars that it is doubtful if any committee could come to an agreement in this matter. There is little doubt, however, but that a uniform section of angle bar could be decided upon, which would be of material assistance to the railroads and rolling mills, and would tend toward uniform economy.

The reasons that appear to be in favor of appointing the suggested committee, with the limitations proposed, are:

1st.—The angle bar being the basis of nearly all the joints now in use, the possibility of arriving at a definite conclusion as to its best form will be much increased if the discussion is confined to it.

2d.—The economy which would result from the general adoption of a standard angle bar.

3d.—A committee of the Society, the purpose of whose investigations is purely scientific, can secure more valuable opinions and reliable data than any individual.

4th.—From the information thus obtained, principles could be developed in such form as to be readily understood by roadmasters. The results obtained by a correct application of these principles by practical men will be of great value in a further study of the subject, and may eventually lead to the adoption of a standard joint.

The reason in opposition to the appointing of the suggested committee is:

It being admitted that a general investigation of the whole subject, with the adoption of a standard, is impracticable, it would not be worth the labor to take up the study of a part only.

On the whole, it appears to your Board that the reasons in favor outweigh that in opposition.

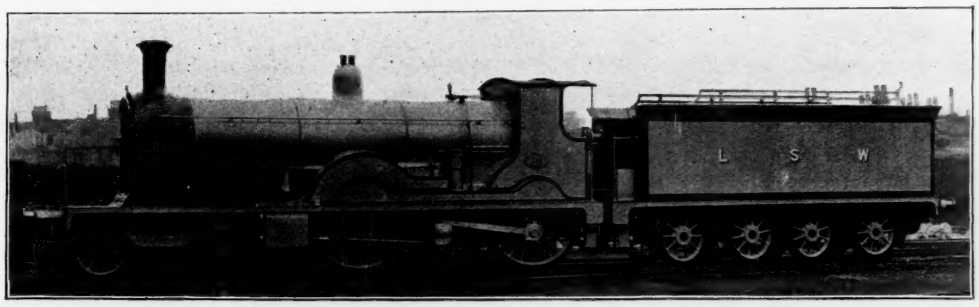
An English Four-Cylinder Engine.

By the courtesy of Mr. Dugald Drummond, Locomotive Superintendent of the London & South Western, we are enabled to present herewith a perspective view of a novel design of express engine, recently constructed at the Nine Elms Shops of that road.

Of late years there has been a great increase of traffic on the South Western, especially since Southampton became the port of the American Steamship Line, necessitating fast trains to and from London.

As will be seen from the engraving, the engine has independent driving wheels, there being no coupling rods. This feature, together with the location of the cylinders, gives the engine the appearance of Mr. Webb's three-cylinder compounds, but here the similarity ceases, for Mr. Drummond's locomotive is a four-cylinder simple engine.

The wheel base of the driving wheels is 11 ft., and of the whole engine 26 ft.; of the engine and tender it is 50 ft. 6 in., and the length over buffers is 60 ft. 1 in. The driving wheels are 6 ft. 7 in. diameter, and the four cylinders are 15 in. diameter, by 26 in. stroke. The cylinders operating the rear driving wheels are outside the frames, and the valve chests are underneath; there is some advantage in this arrangement,



London & South Western Four-Cylinder Passenger Locomotive.

as it enables the valves to drop from their seats when the engine is running without steam. These valves are operated by Joy's valve gear. The cylinders driving the front pair of wheels are inside the frames, with valve chests between them, and ordinary link motion. A simple and efficient steam reversing gear operates all four cylinders, and is controlled by a small lever on the left hand side of the foot plate.

The boiler is large for a British engine, and the firebox is provided with cross water tubes, thereby increasing its fire surface, which reaches 357 sq. ft. With a tube surface of 1,307 sq. ft., the total heating surface is 1,664 sq. ft. The grate area is 27.4 sq. ft. The center of the boiler is 7 ft. 9 in. above the rail. The diameter of the truck wheels is 43 in. The working steam presure is 175 lbs., and the engine is capable of a tractive effort of 16,290 lbs. Its weight in working order is as follows:

	Tons.	Cwt.
On the truck wheels	16	17
" " front driving wheels	18	18
" " rear " "	18	16
Totals	54	11

or 122,192 lbs.

The tender has truck wheels 43 in. in diameter, with inside bearings. It is of large size, carrying 4,500 gallons of water and five tons of coal. The water in the tank can be heated by a portion of the exhaust steam, and the brakes, when applied by hand, are actuated by a vertical wheel on the right hand side.

The weight of the tender loaded is 47 tons 7 cwt. (106,064 lbs.), the front truck wheels carrying 23 tons and the rear truck wheels 24 tons 7 cwt.

No official statement of the performance of the engine has yet reached us, but we understand it is doing very satisfactory work.

The Simplon Tunnel.*

A writer in the London Times dealing with this great work, now just begun, compares it with the St. Gothard and Mont Cenis tunnels. In the former, with its length of 9½ miles, he says the steepness of the gradient rendered necessary the adoption of the corkscrew tunnels, but he expresses the opinion that if the railway were to be constructed now it could be at a lower level, with a greater length of continuous tunnel, but less on the whole than the main and corkscrew tunnels together give now. The height of the mountains above the tunnel being 5,595 ft. meant great heat in the rock, and this was the primary cause of the 600 deaths among those employed in the construction of the tunnel. Inefficient ventilation and the exposure of the men to an Alpine climate, while returning to their homes heated and wet to the skin, and their returning to work again in insufficiently dried clothes, of course worked havoc. He further adds that in a short time the increasing traffic will render a second St. Gothard Tunnel necessary.

In the Mont Cenis Tunnel, nearly eight miles long, the gradients are 1 in 33 on the Italian side, and on the French 1 in 40. Extensive, but almost obsolete arrangements are made for ventilation, but rooms are provided at intervals into which the workmen can retire, and which are supplied with fresh air, drinking water, and the telephone.

The Simplon Tunnel will form the most direct communication between Berne, Lausanne and Geneva to Domo d'Assola, Milan and the North of Italy, and it has the great advantage of being on a comparatively low level. While the altitude of the St. Gothard is 3,789 ft. above the sea, and that of the Mont Cenis is 4,247 ft., the Simplon is only 2,312 ft. Another great advantage it will possess is that the approach on the Swiss side will be of the simplest character. The Jura-Simplon Railway has its terminus at Brieg, in the Rhone Valley, and the tunnel mouth will be on the present level of, and at a short distance from, the end of the existing sidings of Brieg Station. The length of the tunnel will be 12½ miles, the Italian end being at Iselle. The maximum gradient will be 1 in 140, and the work will consist of two parallel tunnels—each for one pair of rails—at a distance apart of about 50 ft.

Every man on coming out of the tunnel will hand his wet clothes to a custodian, whose business will be to dry and clean them for the morrow's work. Each man will be furnished with a substantial meal before going into the open air, and the day shift men will be forbidden to use the beds just vacated by the night shift.

Rotatory drills driven by hydraulic power at a pressure of 1,000 lbs. to the inch will be employed. They have already drilled holes 3 in. in diameter and 40 in. in depth into the hardest granite in ten minutes. The system of ventilation to be adopted will probably be the "Saccardo," by which large volumes of air are thrown in from one end by means of a fan. If electric traction, however, be adopted, as is not improbable, the ventilation will be of the simplest character.

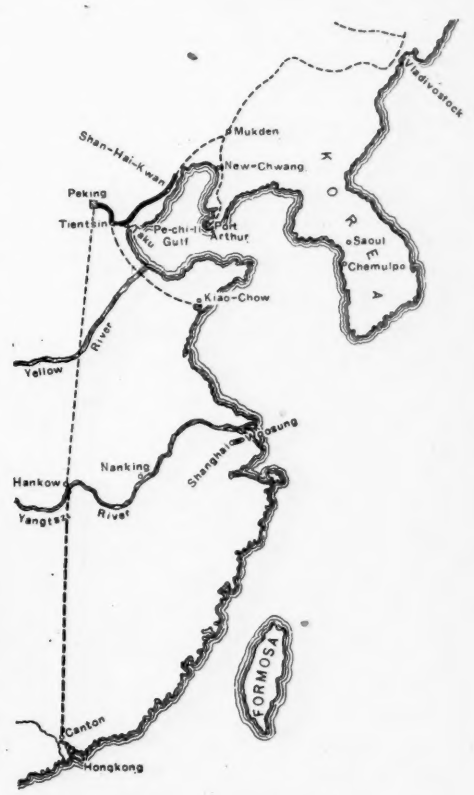
The contract for the construction of the tunnel—exclusive of land and certain other items—is about £2,800,000, and the time for its completion is 5½ years. The contractors are Messrs. Brandt, Brandau & Co., of Hamburg, with whom is associated Col. Locher, of Zurich.—Transport.

* For a technical description of the Simplon Tunnel, with engravings, see the Railroad Gazette, Dec. 23, 1894, page 880.

American Contract for a Railroad in China.

The American China Development Company, of which prominent New York and Philadelphia capitalists are the chief owners, has made a contract with the Chinese Government to furnish money, presumably the whole sum required, to build a railroad from Han Kow south about 800 miles to Canton, and American engineers will be sent over at once to make a reconnoissance of the line. Mr. Calvin S. Brice, one of the chief officers of the company, says that in the Development Company are seven representatives of the Vanderbilt interests, the presidents of several trust companies, John D. and William Rockefeller, Levi P. Morton, George T. Bliss and the Carnegie Steel Company. The contract has already been duly ratified by the Chinese Foreign Office. It appears that the American company is to buy Chinese Government bonds, taking for security a mortgage on the railroad and a lien on its revenues; and is to take the contract for building the road. The ownership of the road appears to remain with the Chinese Government. The contract provides for making connection with Hong Kong, which is on an island, about 100 miles southeast of Canton. The cost of the road is estimated at from $20,000,000 to $40,000,000.

We reprint herewith the map of Chinese railroads



Proposed Railroads in China.

which appeared with an article on the subject which was published in our issue of April 8. We have added a heavy dotted line showing the general direction of the road to be built by the American company. In connection with the line for which the contract has been let to Belgians, it makes a through line of about 1,500 miles between Pekin and Canton.

General William Barclay Parsons is Chief Engineer for the syndicate which has secured the concession and contract mentioned above, and he is now organizing his corps and will probably sail from San Francisco for China on Oct. 29. His expectation is to make a rapid but thorough study of the line and to be able to submit a report in about eight months. The country is almost unknown to Europeans, and no maps of the region which are of any value can be obtained. Therefore, one important part of the work

will be to secure data from which fairly accurate maps can be prepared, and so this reconnoissance will be an important contribution to geographical knowledge.

Of course it is unnecessary to introduce General Parsons to the American readers of the Railroad Gazette, but for the benefit of our foreign readers we may say that he is Chief of Engineers on the staff of the Governor of the state of New York with the rank of Brigadier General; that for a number of years he has been Chief Engineer for the Rapid Transit Commission of the City of New York, and has prepared plans and estimates for that extremely important work. He has long maintained a consulting engineering office in New York City, and has been constantly occupied in the location, construction and equipment, and also in the revision of the lines of a number of railroads in the United States and in foreign countries. His work in this way has extended to the West Indies and to Central and South America.

Rails for Street Railroads.*

By A. J. Moxham.

The problem of wear upon a steam railroad is a very different thing from that of wear upon a street railroad. The rail in steam railroad use presents a clean head, because the rail is not buried. It has to oppose principally a rolling friction, for the number of times per mile that steam railroad trains are stopped is very few, taking a general average. The street rail, on the other hand, has not only to meet this rolling friction, but has to contend with the grit from the surrounding roadbed, and with stops every few feet. Not only are the stops incomparably more frequent, but they are again multiplied into a greater number of units, as many individual cars are the rule on street railroads, as against the occasional train of the steam road.

Being unable to reach positive conclusions from the published authorities and from personal contact with the steel experts of the country, or even from our own experience, it was determined to conduct experiments to this end. . . . . The experiments have lasted for three years. The first endeavor was to take broadly, a "soft" steel and a "hard" steel for the rails to be tested, securing the difference by carbon alone, leaving all other ingredients as nearly as possible the same. The experiment with these was started in October, '95, and has been continuous ever since. In June, 1896, additional rails were added to the experiment, supplied by the West End Street Railway Company, of Boston, who, at that time, had determined (with wisdom, as will be seen subsequently) upon a steel both hard and ductile. The conclusions, therefore, are based upon what may be described as soft steel, hard steel and steel both hard and ductile.

The rails (some 33 in all) were laid in the South Eighth street tracks of the Nassau Electric Railroad of Brooklyn. They were laid continuously, so that the same car is obliged to pass over every rail, and therefore each rail is subject to the same wear, and the wear on the head only is considered. Street traffic is ignored. The point was selected as one that would give great wear in a short time, in order to reach early conclusions, as the cars pass this point at extremely short intervals.

Every rail has been measured at two points, taken about 10 ft. from each end, in order to eliminate the special wear at the joints. Each rail has two cast iron boxes bolted to the outside, at the points to be measured, to permit access for purposes of measurement without disturbing the roadbed. Originally the wear was registered both by actual measurement and by taking an impression of the head of the rail by means of type metal castings. Two slots were provided in the tram of the rail to guide the type metal mould. Notwithstanding the great care that was exercised in taking the impressions this method of measurement was quickly given up, as the results were far from being as acurate as those taken by micrometer calipers. With these calipers, measurements of each rail were taken at three points across the head of the rail: Point No. 1 is 2 in.; point No. 2 is 1⅝ in., and point No. 3 is ⅞ in., all from the outside of a head 2¼ in. wide. Methods were adopted for accurately locating the same lines, so that the comparisons in the different measurements of wear could be relied upon.

There were 17 rails of low carbon (averaging .28); 14 rails containing high carbon (.59), and two were West End rails.

	Soft.	Hard.	West End.
Carbon	.280	.59	.570
Silicon	.026	.056	.224
Phosphorus	.106	.097	.050
Sulphur	.066	.059	.078
Manganese	.790	.83	.980
	1.268	1.632	1.912
Iron	98.732	98.368	98.088
	100.	100.	100.
Specific gravity	7.855	7.841	7.825
Based on iron only, ignoring the metalloids	7.956	7.971	7.977

The average monthly wear amounted to .0017 for the West End rail, .0012 for the hard rail, and .0017 for the soft rail. The results of the experiments are conclusive on this point. We will, therefore, in the subsequent analysis, start with this as a fact.

It is interesting to note the very close relations of this arbitrary specific gravity to the relative wear as shown in the test. This is not a point to be ignored, because it is an exponent of the mechanical treatment, and it explains consistently in this, as in many other cases, why the material with apparently (but not really) the lightest specific gravity, will show the best results in use. The analysis shows that what is needed, as may be expected, is the densest steel.

Taking now the tension and compression tests, in the tension tests the ultimate strength stood as given in column A:

	A Lbs.	B Lbs.	C Lbs.
Soft rail	75,860	45,730	35,000
Hard rail	118,100	62,500	50,300
West End rail	120,380	53,160	47,100

Closely following the determined wear. In elastic limit the relation is given in column B. This it will be noted does not follow the rule of wear, and in this is a lesson, the indication being that having secured a given amount of hardness, and consequently of strength, that the more ductile the rail the better the wear. In the compression tests the same lesson is learned, the elastic limit of cmopression being given in column C.

At a glance it would appear that the rail compressed the least would wear the longest, but where difference in compression is indicative of greater elasticity without a sacrifice of ultimate strength, it is within reason to the good.

We will deal now with chemical composition, comparing first the soft and hard rails:

As stated before the only variation in chemical composition which we need look at in this comparison is the carbon, for while there is a slight variation between the two silicons in the given rails, the total percentage of silicon in either is not a factor, and can therefore be ignored. The greater durability of the hard rail as compared with the soft rail speaks for the higher carbon, and it may here be noted that so far as higher carbon is concerned it involves no higher cost to street railroad men.

On comparison, the carbon of the West End rail is practically the same as that of the hard rail, silicon considerably higher; but the real point of difference between the hard rail and the West End rail lies in the lower phosphorus and higher manganese. It is well known that the low phosphorus accompanied by an increasing manganese conduces to greater ductility. On this point, however, a word of caution is necessary. Any decrease of phosphorus from what is known as standard in Bessemer steel, viz: .10, can only be obtained at a greatly increased cost, and therefore, so far as the chemical constituents of the rail are concerned, the whole problem to the street railroad man is how far it is economical to go in lower phosphorus, the other hardening elements remaining the same. A steel such as represented by the West End rail, or even a steel still lower in phosphorus it is possible to make—it is purely a question of cost. On to-day's basis an extra cost of $1.50 per ton on the low phosphorus steel is a low estimate; it would be safer to take it at $2. Taking the average price of girder rails at, we will say, $25, the extra cost of the low phosphorus would be 8 per cent. What would be the increased wear of the rails?

The average monthly wear of the hard rail is.... .0012
The average monthly wear of the West End rail is ..... .0007

On the face of it it would appear, therefore, that those who could afford it were amply justified in demanding and purchasing the low phosphorus steel, but there is a hope for those who cannot afford it; and there is some doubt, after all, as to the advantages to be gained from so doing, which, to my mind, brings us to the real lesson of the whole experiment. Pay close attention to what follows:

We all know that we can use a street rail until at least one-half inch is worn away from the head. On this basis, and taking the average wear of the different rails as shown in the test, it would take 25 years to wear away ½ in. with the soft rail; 35 years to wear away ½ in. with the hard rail; 60 years to wear away ½ in. with the West End rail; and this is the case of a road which represents not average, but excessive, wear; the rails in question having borne the wear of heavily loaded cars running on an average of 580 per hour for 20 hours a day, during the time of the experiments, or a two-minute headway. This means during the busy part of the day less than one-half minute headway, and during the night hours a wider interval. Taking the ordinary line, its average headway is less than this, consequently the theoretical wear would be greater. Now all of us who are interested in electric roads and have used girder rails are aware of the fact that we do not get anything like this wear, and this being the case we have got to look to something else besides quality of steel. I think we all know what the cause is, and I am glad to again emphasize it, because it discloses a great evil we are still suffering from without realizing it to the extent we should—the defect is in the joints.

Had these measurements of wear been taken at the joints instead of elsewhere, the lesson would have been different. Rails are taken out of the track to-day, not because the rail as a whole has reached the point of destruction, but because the joints have become too bad for further use. It must be remembered that the experiments in question have not been extended long enough to show the effects upon the rail of the degeneration of the joints. On the wear at the joints reaching a certain point, the wear of the rail increases rapidly. For instance, in the soft rail the average monthly wear being .0017 during the time of this experiment, in seven or eight years from this date the wear will have continued to go on at a constantly increasing ratio, starting from the point of defect at the joint.

In the early days of girder rails the joint question was before us all. It was self-evident, in that the earlier construction was so light that the joints quickly went to pieces. During later years, using a heavier rail and larger and better fitting splice bars, we have heard less of this joint question, for as compared with the earlier joints the track is comparatively smooth. Nevertheless, the evil still exists, and a few years from now those who to-day are deluding themselves in the belief that they have a long life for their existing tracks will awake to find out that even the construction of to-day is wasteful and extravagant in this respect. The joint which is accepted now as being passably fair is reducing the life of the rail to one-half or perhaps even one-third of what it should be.

The conclusions seem to be as follows:

First.—For street railroads, a hard rail will give the best results.

Second.—That the most economical way to secure this hardness is by increase of carbon, accepting the manufacturer's standard specifications for the other ingredients.

Third.—That the next step should be towards an improvement of the joints. The writer has pinned his faith to the electric welded joint as settling the question once for all, by making the union homogeneous with the rail and possessing an advantage from an electrical standpoint in the matter of conductivity. Nevertheless, the cast-welded method also demands careful consideration. It is certainly preferable to anything in the nature of splice bars that we know of, provided one glaring fault can be overcome, viz.: the softening of the steel that occurs from the large body of hot cast metal located at that point, and it would appear that some means could be devised to overcome this evil.

Fourth.—After making the joints perfect, what we have termed the "West End rail" would certainly justify its extra cost. I would caution, however, against the use of carbon as high as .59, as that was purposely taken high in what we term the "hard" rail in this experiment, the object being to reach an extreme. Carbon should be limited to from .50 to .55, with the usual leeway to cover contingencies in making the rail. It also remains a question whether the reduction of phosphorus to .08 (which may be done within economical limits of cost) will not give results so closely approximating the .05 of the West End rail as to make that figure an economical one. Whether or no, the certainty exists that, so far as the steel is concerned, a rail of the following analysis should give a theoretical wear, if the joint is perfected, of from 40 to 50 years, viz.: Carbon, .55; silicon, .10 or under; phosphorus, .08 or under; sulphur, .06 or under; manganese, .83 or over, not to exceed 1.00.

The great lesson I would once more emphasize is that, until you get the joints perfect, you need not worry about the quality of your steel; anything in the shape of steel—the very cheapest you can buy—will last longer than the joints will permit you to keep your rails in the track.

* From a paper presented at the annual meeting of the New York State Street Railway Association, Sept. 12, 1898.

100,000 lbs. Capacity Steel Car for the Northern Pacific Railway.

The Northern Pacific has now in service a sample steel hopper bottom coal car of 100,000 lbs. capacity, which was built by the Gillette-Herzog Manufacturing Co. of Minneapolis, from designs made by Mr. E. M. Herr. It is probably more correct to call this an experimental car, for it has not yet been decided whether more of these will be built, as it is thought that before trains of such large units can be hauled on the Northern Pacific considerable money will need to be spent in track and bridge renewals. It is expected, however, that the experience with this car will give data as to the cost of steel car repairs and in other ways show whether it will be advisable to use cars of such large capacity.

From the standpoint of a design, this car is interesting as showing how space sufficient for 50 tons of coal can be got in a hopper bottom car 30 ft. long over end sills. It is quite evident that by making the car as short as possible the distance between the supports of the longitudinal sills is reduced, and hence the sills can be of lighter sections, which in turn materially reduces the dead weight. Rolled steel shapes are used throughout this car, and the principal dimensions are: Length over end sills, 30 ft.; width over sills, 9 ft. 6 in.; height of body 7 ft. 9 in.; height from rail to top of sides, 10 ft. 4¾ in., and distance from center to center of trucks, 20 ft. 8 in. The cubic capacity when level full is 1,557.09 cu. ft., and when the load is heaped 18 in. at the center the capacity is 1,740.44 cu. ft.; the new 70,000 lbs. capacity wooden hopper cars of the Northern Pacific, illustrated Feb. 4 last, have a capacity of 1,070 cu. ft. when level full.

The engravings show the construction in considerable detail, but it may be especially noted that the center sills are two 15-in. 33-lb. steel channels, with $\frac{7}{16}$ in. top and bottom cover plates, thus forming a box girder, while the side sills are 15-in. 50-lb. steel I beams, and no intermediate sills are used; none of the sills have truss rods. At the ends the sills are connected by a steel Z bar at the top and by an angle at the bottom, while the ends of the side sills are braced by angles running diagonally to the middle of the body bolster.

The framing of the car body consists of 3 in. x 2½ in. angles for posts, counter braces of 2½ in. x 5 in. oak, and a top plate made of a 4-in. 8-lb. steel channel with the flanges turned downward. The vertical sides and ends are lined with 1¾-in. pine planks, and the sloping ends with 2½-in. oak planks. The hopper commences at the bottom of the sills and slopes upward at an angle of 33°, being supported at four points. In this way the center sills extend through the coal space and are protected on the top by a pine timber 8 in. deep and 21 in. wide. In the same way the transverse shafts for operating the doors are run through a box formed of two 9-in. steel channels on top of which is placed a pine protection timber. The bottom doors occupy the entire space between center and side sills, and have a total length of 12 ft. They are arranged, as shown, in four pairs, making in all eight leaves, which are hung from the sills by cast steel hinges. The doors are of ¼-in. steel plates reinforced with angles. They are closed by a winding shaft provided with a ratchet and chains, and are supported in the closed position by a 1¾-in. crow-foot rod; the dumping rigging can be operated from either the top or the bottom of the car.

The draft rigging consists of four malleable iron

lugs riveted to the inner sides of the center sills, which form the stops for the follower plates. The two outer lugs support a 9 in. x 9⅜ in. oak block, which is placed back of the cast steel dead blocks.

The car has Westinghouse quick-action air brakes, with independent auxiliary reservoir and brake cylinder.

The body bolster is built up of ¾ in. x 10 in. steel top and bottom plates, which pass respectively above and below the center sills; a ⅜-in. steel center web plate between the side and center sills, and 2½ x ⅜ in. steel connecting angles; between the center sills a cast steel filling piece is used, riveted to the sills and bolster plates.

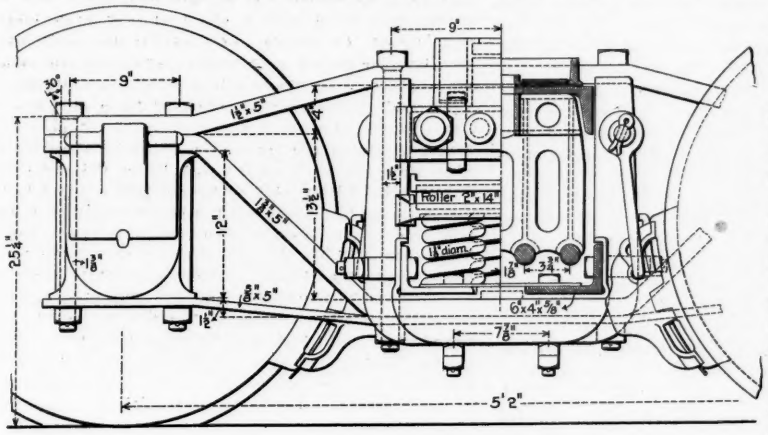
The truck is of an arch bar type, braced by two ⅝ in. x 4 in. x 6 in. angles, as shown by the detail drawings. This truck embodies the distinguishing features of the trucks previously designed by Mr. Herr for lighter cars in that the columns and spring seat, for each side of the truck, are cast in one piece of malleable iron; also the Barber rolling bearing device is used under the ends of the bolster. The coil springs are of 1⅛ in. steel arranged in groups of five, the axles are steel with journals 5½ in. x 9 in. and chilled wheels are used weighing 750 lbs. each.

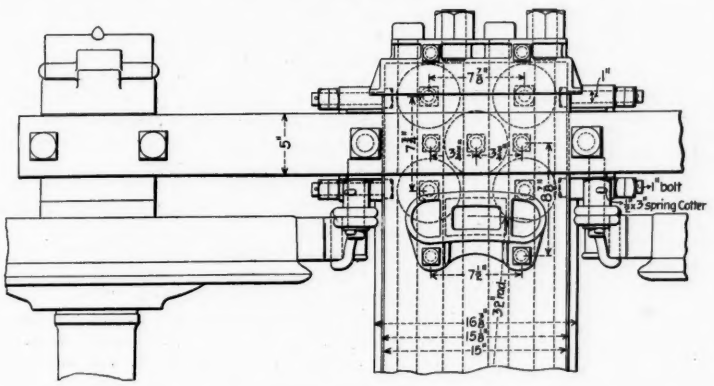
The truck bolster used with this car is the first one built so far, although a design for a similar bolster has been made for 70,000 lbs. capacity cars. It has for a top member a 15-in. 48-lb. steel channel with the flanges turned downward, while the tension member consists of four 1⅝-in. steel truss rods having a head on one end and a nut on the other. The outside depth at the center is 14½ in., the top of the bolster being 2 in. higher at the center than at the ends. The central strut as well as the center and side bearings and the end castings are of malleable iron. The end casting is made in two pieces which are bolted together beyond the end of the channel by two 1-in. vertical bolts, while it is also bolted to the top channel by two 1-in. bolts under the arch bar. The end casting forms a box through which pass the bolster truss rods, while there are also projections on this casting which act as guides. A thin steel liner is placed between the center plates and an oak block is used above the springs, which fills the space beneath the end casting. As will be seen, the brakes are inside-hung, with the hangers attached to the columns.

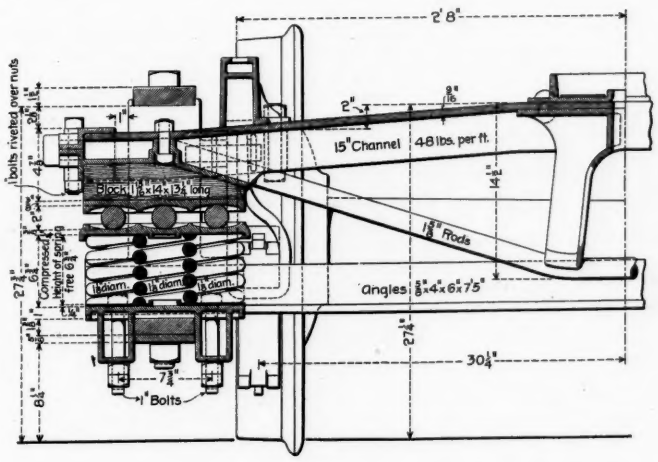
The Railway Signaling Club.

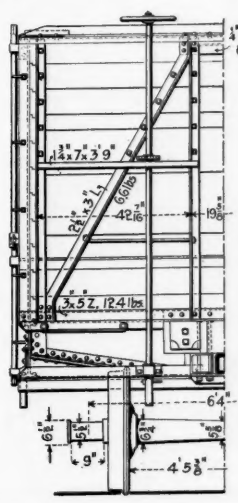
The first autumn meeting of the Railway Signaling Club was held at the Great Northern Hotel, Chicago, Tuesday evening, Sept. 13, and definite action was taken in the matter of recommending standard sizes for all the parts commonly used with interlocking and signals. This subject was discussed at some length at the May meeeting, and at that time it was decided to refer it to a vote of the members; and a committee of three on standard design was at that time appointed to look after the correspondence.

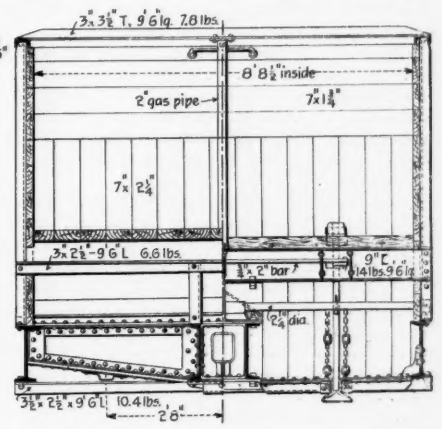
The letter ballot since taken shows that a majority of the members are in favor of recommending standard parts, and a number of letters were read commending this course. The Committee on Standard Design presented a preliminary list of parts which, in its judgment, should be made uniform to insure in-

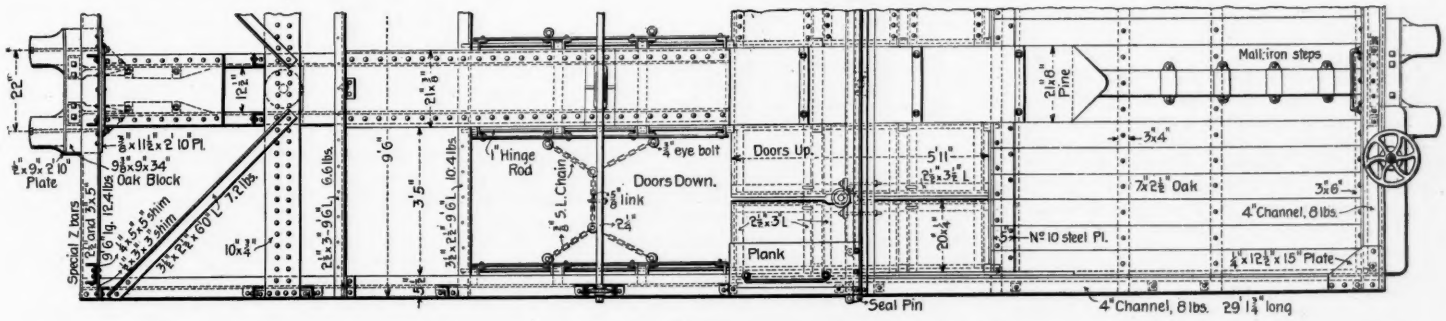


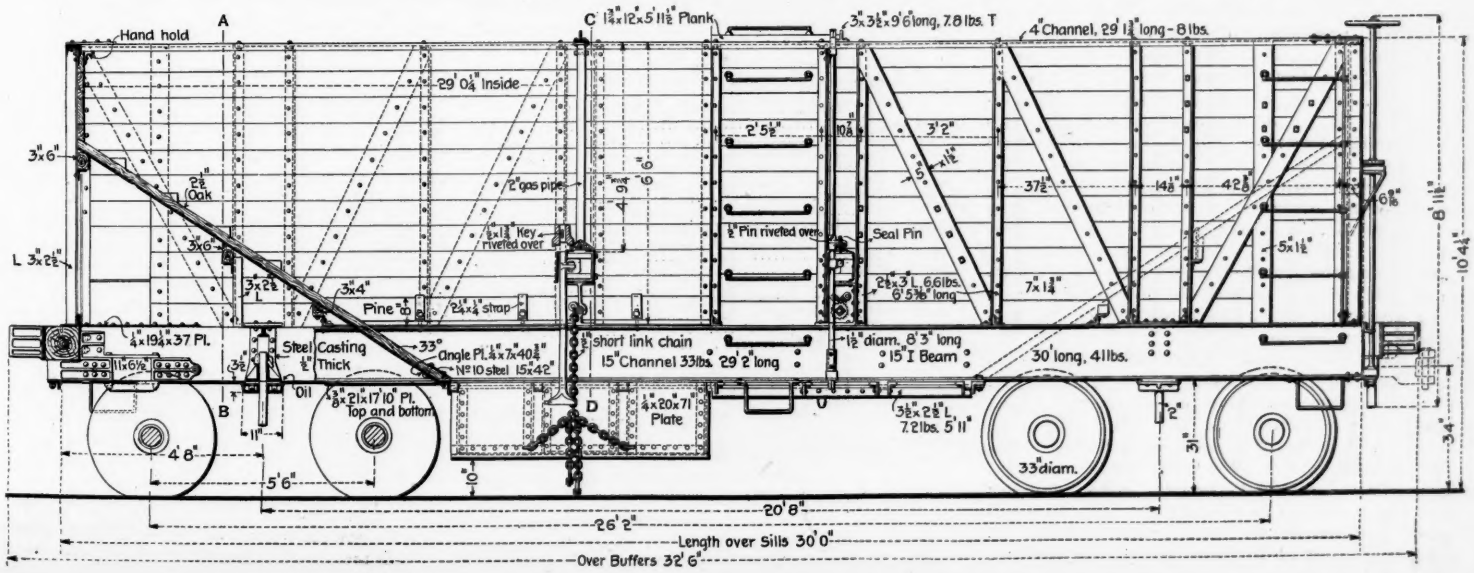












STEEL FREIGHT CAR OF 100,000 LBS. CAPACITY FOR THE NORTHERN PACIFIC RAILWAY.

terchangeability; but sugestions from members or others will be gladly received at any time. The list will shortly be sent out to the members. It should be remembered that the work of this committee is merely that of selecting such dimensions of common parts as will be nearest to what is now in most general use, and has nothing to do with questions of best practice or specifications.

The discussion of the report entitled, "Some Interlocking Devices," presented at the May meeting, was then taken up for discussion. This report was published in the Railroad Gazette, May 27, p. 372. There was so much discussion of the first paragraph that a motion was made and carried to appoint a committee of five which should carry on an investigation and formulate standard specifications for signals and interlocking, taking up the question of best practice in the matter of details. This second committee is to work in connection with that on standard design. The report on "Interlocking Devices" was then referred to the Specification Committee without further discussion.

The topic, "Distant Signals," was then discussed with a view to bringing out opinions as to the necessity of distant signals, the distance from the home signal at which they should be located, and the question of their safety. Mr. C. S. Rhodes, Superintendent of Telegraph of the Cleveland, Cincinnati, Chicago & St. Louis, considered the distant signal of little use, if not absolutely dangerous, and favored doing away with such signals. They are of use only in bad weather. A fixed (unchangeable) signal, placed about 3,000 ft. from a crossing, compelling all trains to approach under control, is sufficient. Mr. H. M. Sperry (National Switch & Signal Co.) pointed out that the use of distant signals was largely a matter of operation. If high speed trains were to be run on time they are necessary, but if a road only had slow, unimportant trains, they could well be dispensed with. By the use of electric locking, so that a route once set up could not be changed, there was no danger from using distant signals. The proper distance which they should be placed from the home signal depended entirely upon the grades. Mr. Neff, Superintendent of the Union Loop, Chicago, agreed with Mr. Sperry. Mr. W. H. Elliott, Signal Engineer of the Chicago, Milwaukee & St. Paul, did not favor the use of distant signals, except where the view of the home signal was obstructed, or where it was desired to maintain a fair speed of trains over a crossing in bad weather.

A communication was read from Mr. Charles Hansel of the National Switch & Signal Co., bringing up the question of different methods of connecting signals; whether by one wire, two wires, or by pipes. There was general agreement that pipe connections were to be preferred where the additional expense was not too important a factor. On the Pennsylvania Lines at Carnegie, there is now a pipe-connected distant signal 2,580 ft. from the tower. It has eleven 12-in. cranks in the pipe line, but it works easily.

The next meeeting of the Railway Signaling Club will be held Tuesday evening, Nov. 8, at the Great Northern Hotel, Chicago.

The Fiftieth Anniversary of the Society of Civil Engineers of France.

There was held in Paris, beginning June 10, and continuing four days, the 50th anniversary of the Société des Ingénieurs Civils of France. Twenty-five foreign engineering societies which had accepted the invitation to participate in this anniversary were represented by 62 delegates from England, Austria, Belgium, United States, Spain, Holland, Mexico, Portugal, Russia and Switzerland, and 39 delegates were present from 22 French societies. The general programme comprised reunions and congresses and conferences on various subjects, as well as the dedication of a monument to M. Eugene Flachat, who, with some of his colleagues, was the founder of the Société. After an address of welcome, the acting President, M. Loreau, presented to each of the delegates two volumes prepared for the occasion by different members of the Society under the direction of M. G. Dumont, one of the Vice-Presidents, and containing the history of the most remarkable engineering works executed during the last 50 years by members of the Society. The preparation of the volumes for each branch of civil engineering was intrusted by the management to competent experts, which gives to these books a considerable scientific value.

Recognizing that the preparations for the Exposition of 1900 would be to most of the members a very strong attraction, the business session of the first day was given up to papers relating to different phases of this subject. M. Briere, Engineer in Chief, discussed the extension of the Orleans Railroad into Paris. M. Alby described the works at the Bridge Alexander III., of which he is the engineer. M. Courtois, the architect of the Palais de l'Exposition, explained all the inside arrangements. These different papers were designed to make as profitable as possible the visits next day to the works themselves. That evening a grand reception was given at the Continental to all the invited guests.

A visit to the stoneyard of the Exposition occupied the morning of the second day. Three hundred persons participated and were received most cordially by the Director-General, M. Picard. Then the lecturers of the preceding day, MM. Alby and Courtois, put themselves personally at the disposal of their guests, who examined in detail the different works which had been so admirably described the day before. Two things which attracted the especial attention of the foreign engineers were the improvements made with ceilings of cement concrete, which had the advantage of light weight combined with great strength. A square meter can support a weight of 1,500 kilograms. This weight was doubled in the experimental test, with an observed deflection of only .002 meter. Another striking thing was a wheel carrying on its periphery diamond points, which is used for cutting the blocks of stone employed in the construction of the Palais des Champs Elysees. It is wonderful to see with what rapidity and facility this contrivance reduces the stones to their proper dimensions.

In the afternoon of the same day the President, with more than 600 invited guests, received the President of the French Republic. After an address of welcome to the Chief Magistrate, several subjects on the programme were discussed, the first by the delegate of the Bureau of Roads and Railroads of Russia, General de Wembrech, who spoke on Russian Railroads. The ceremonies ended by a eulogy of M. Flachat, whose monument had been dedicated the same day.

The President of the Republic thanked the Society for the services it had rendered to France, and expressed a hope that it would continue its brilliant and useful career. In conclusion, he conferred degrees of the Legion of Honor and other orders of France on several members of the Society.

The last day of the celebration was devoted to the works along the Seine. In the afternoon two boats decorated with flags took the greater part of the trip down the river from the Bridge of Austerlitz as far as Passy. This expedition was accompanied by several engineers of the Orleans Railroad and of the Western Railroad, who explained the extension of the tracks of the Orleans Railroad from the station to the Quai d'Orsay; also the prolongation of the old line of Molineaux to the connection with the line at Auteuil. This comprises a skew bridge over the Seine at the middle of the island of Cygnes, then a tunnel under Passy. The construction of the bridge presented some special difficulties, which led to the design of a bridge at the same time on a skew, on a curve, and on a grade.

The anniversary was brought to an end by a banquet laid for 600 guests, at which the Minister of Commerce presided, and at which complimentary toasts were exchanged between the French and the foreign delegates.

The Quebec Bridge.

At the annual general meeting of the stockholders of the Quebec Bridge Co., held in Quebec Sept. 6, it was decided to call for bids, at once, for building the bridge across the St. Lawrence at Chaudière, five miles above Quebec. The bridge will be a cantilever structure 3,310 ft. long, including approaches, with a main channel span of about 1,400 ft., and 150 ft. above high water. It will cost between $3,000,000 and $4,000,000.

This project, which, besides the bridge, includes a railroad to connect the railroads on both sides of the St. Lawrence, has been under way for about 10 years, and technical reports were made for the Quebec Bridge Co. by Mr. Walter Shanly, C. E., as early as 1889. Four sites were at first considered, but one, the Island of Orleans, where two separate bridges, with a total length of 15,000 ft., would be required, was early set aside. The company's engineers have examined each of the other three sites in detail and several technical reports have been made during the last few years. The chief reasons for selecting the Chaudière site may be seen from the comparative figures given in Mr. Shanly's report:

Width of River—High Water.

The Citadel	4,281 ft.
Pointe-á-Pizeau	5,468 "
Chaudière	2,590 "

Extreme Depth of Water on Pier Sites.

The Citadel	132 ft.
Pointe-á-Pizeau	125 "
Chaudière	43 "

Extreme Height of Piers from Bottom of River to Under Side of Bridge.

The Citadel	282 ft.
Pointe-á-Pizeau	275 "
Chaudière	193 "

Steel Bridging, River Spans and Shore Viaducts.

The Citadel, over all	5,291 ft.
Pointe-á-Pizeau, over all	6,850 "
Chaudière, over all	3,100 "

During the past year surveys, plans and profiles were completed for the railroad connections with the bridge on both sides of the River St. Lawrence, and for the bridge site itself. It is the intention of the company to have its own independent line to give all the railroads access to the city of Quebec. The roads that will derive benefit from the bridge are, on the north shore, the Canadian Pacific and the Quebec & Lake St. John, and on the south shore, the Grand Trunk, the Intercolonial and the Quebec Central.

Mr. E. A. Hoare, Chief Engineer of the Quebec Bridge Co., under date of Sept. 3, made a report on the results of the test boring completed this year, at the Chaudière site, and he states the effect that the formation of the river bed will have on the pier foundations. The report is in part as follows:

"The formation within the limits of high water was found to consist of rock underlying compact boulder gravel, with pockets of finer gravel near the surface. On the south side, above high water mark and extending from the cliff for a distance of about 150 ft., a pocket of clay containing boulders was found overlying the rock, at a depth of about 80 ft. The minimum depth to the rock below the river bed at any point within high water mark was found to be about 40 ft. The piers for the short approach spans will be on surface rock. The two main piers, and a third pier, will be the only piers that will be built wihin the limits of high water mark, and they will all be clear of the navigable channel. The piers for the central span will be in 20 ft. of water at low tide, the foundations for which will be sunk from 50 to 60 ft. into an unyielding bed of boulder gravel by the pneumatic caisson process, which, comparatively speaking, is not uncommon for bridges of a similar size. The third pier will be close to the north shore, where the river bed is above low water. The foundations for this pier will be constructed in open caisson, sunk about 16 ft. below river bed into the boulder gravel. Pier foundations on the south side, between high water mark and the cliff, will be of ordinary construction on dry land, founded on the hard clay already mentioned. If it should be considered advisable to increase the channel span beyond the minimum allowance of 1,600 ft. to about 1,800 ft. and change the general design to suit, the two main piers would then be in 7 ft. of water, and it would only be necessary to sink the foundations from 30 to 35 ft. below the river bed. The plan to be finally adopted will depend upon the comparative merits of the proposals to be received from bridge construction companies."

General plans showing certain limiting dimensions and other essential data, with printed circulars, forms of tender, complete specifications for foundations, piers, and superstructure are now ready to be sent to intending contractors, notice having been received on Sept. 1 that the specifications for superstructure had been finally approved by the Chief Engineer of Railways and Canals.

The bridge company has petitioned the Dominion Government for a subsidy of 33⅓ per cent. of the cost of the enterprise. It is expected that the Province of Quebec and the City of Quebec will between them vote sums amounting to another third. The balance of the cost will be met by issuing bonds.

The officers of the Quebec Bridge Co. are: S. N. Parent, President; R. Audette and R. R. Dobell, Vice-Presidents; John Breakey, Treasurer; Ulric Barthe, Secretary.

New Mogul Locomotives of the Chicago Great Western Railway.

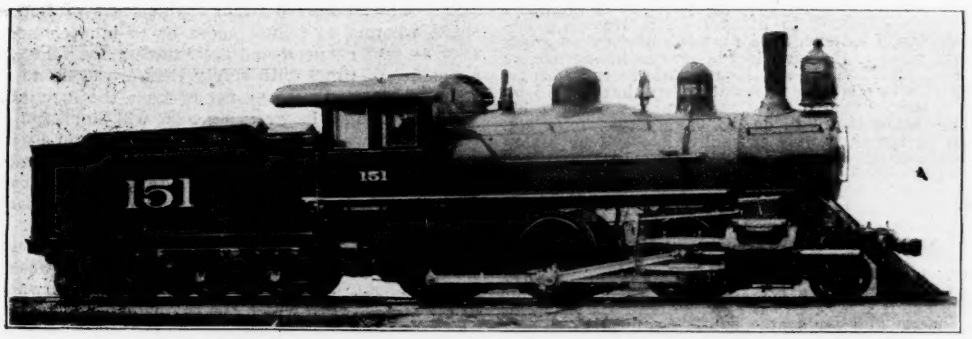
The Chicago Great Western recently put in service two mogul freight locomotives, one compound and one single expansion, which were built by the Richmond Locomotive Works from designs of Mr. Tracy Lyon, Master Mechanic of that road. These engines differ in a number of respects from common practice, due largely to the limiting conditions of the road. At the present time on the Chicago Great Western it is considered that the limit of weight which the track and bridges will stand is 100,000 lbs. placed on a wheel base of 15 ft.; also while there are no very long or heavy grades, yet there are on each division 1 per cent. grades of sufficient length that the momentum of the train cannot be a very important aid in passing over them. They are, however, sufficiently short so that from an operating point of view the question of the time taken to ascend the grades can be entirely neglected and trains may be permitted to approach the summit at a minimum speed. Of course the problem was to design an engine which would come within the limits for weight and yet haul the heaviest possible train.

The two engines are identical in all respects excepting in the matter of cylinders, the simple engine having 19 in. x 28 in. cylinders, while the compound cylinders are 21 in. and 33 in. by 28 in. The weight on the driving wheels is 100,000 lbs., and the total weight in working order 120,000 lbs. The driving wheels are 60 in. in diameter.

It is quite evident that according to the usual practice these engines are very much "over-cylindered." The tractive effort, based upon a mean effective pressure of 85 per cent. of the boiler pressure, is 28½ per cent. of the weight on the drivers and on the maximum grades it is expected that the tractive effort will reach at least 30 per cent. Recent improvements in pneumatic sanders are such as to have considerably changed the relation between the possible tractive effort and the weight on the drivers, and when using sand it is found that these engines do not slip, even when worked to their full capacity. To further guard against slipping, the equalizers between the main and back driving wheels, instead of being made with arms of equal length, as usual, are so divided that the additional weight of the main drivers is taken into account in order that the weight on the rails of each pair of drivers may be the same,

instead of the weight on the journals. It would seem as though this is worth while if it will diminish the tendency to slip, even by a small amount.

These engines were designed to haul a load of 950 tons, excluding the locomotive and caboose, up any grade on the road at such speeds as are desired until



Mogul Freight Locomotive—Chicago Great Western Railway.

the 1 per cent. compensated grade is reached, and then to make the remaining portion at slow speed by the use of sand delivered in front of both the forward and main drivers; in such cases, as was previously stated, a tractive effort of 30 per cent. is counted on. The performance of the engines would seem to confirm these expectations. On Aug. 31, Mr. Lyon advises that the simple engine hauled a load of 900 tons, excluding the weight of the locomotive and caboose, up a 1 per cent. grade five miles long, and with this train it was not found necessary to work the engine to its maximum capacity. The rail was in good condition, but the drivers slipped some on the curves and sand had to be used at such points. It is believed that the hauling power of these locomotives is greater than that of any previously built of the same weight.

Some of the features of the construction deserve mention. Thus it will be seen from the engravings that all the driving wheels have flanges and that the frames are so forged that the brake rigging can be attached directly to the frames. The center of gravity of the boiler has intentionally been made as low as possible, as it is considered that this point is of no small importance from a track standpoint. The main driving wheel centers are made of cast steel and the forward and rear centers of cast iron. The tender has a tank of 5,000 gallons' capacity, which is unusually large for an engine of this size. The tender frame is of 9 in. steel channels with wooden end sills, while the trucks are entirely of steel, with diamond frames, Barber's roller device under the ends of the truck bolsters and elliptic springs.

The general dimensions and special equipment are as follows:

Mogul Locomotives—Chicago & Great Western.

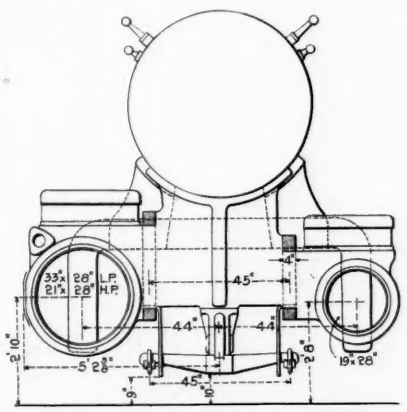
Gage	4 ft. 8½ in.
Simple or compound	1 simple, 1 compound.
Fuel	Bituminous coal.
Weight on drivers	100,000 lbs.
" " truck wheels	20,000 lbs.
" total	120,000 lbs.
" tender, loaded	74,000 lbs.

General Dimensions.

Wheel base, total, of engine	23 ft. 1 in.
" " driving	15 ft. 0 in.
" " total (engine and tender)	48 ft. 0 in.
Drivers, diameter	60 in.
" material of centers	Main, steel; others cast iron.
Truck wheels, diameter	30 in.
Journals, driving axle, size	8 in.
" truck " "	5½ in.
Main crank pin, size	5¾ in.
Cylinders, diameter	Compound, 21 and 33; simple, 19 in.
Piston, stroke	28 in.
" rod, diameter	3¼ in.

	Compound. H.P.	Compound. L.P.	Simple.
Steam ports, length	20	23	20 in.
" " width	1½	2⅜	1½ in.
Exhaust ports, length	20	23	20 in.
" " width	3	3	3 in.
Bridge, width	1¼	1¼	1¼ in.

Valves	American balanced.
Boiler	Extended wagon top.
" working steam pressure	200 lbs.
" material in barrel	Acid steel.
" thickness of material in barrel	⅝ and ⅝ in.
" diameter of barrel	58 in.
Kind of pistol rod packing	Metallic.
Main rod, length center to center	7 ft. 9 in.



Half-Sections Forward of Cylinder.

Seams, kind of horizontal	Double cover strips, sextuple riveted.
Seams, kind of circumferential	Double riveted.
Thickness of tube sheets	½ in.
" crown sheet	⅜ in.
Crown sheet stayed with	1⅛ in. radial stays.
Dome, diameter	31 in.
Firebox, length	96 in.
" width	42 in.
" depth, front to grate	65¾ in.
" " back " "	53¾ in.
" material	Steel.
" thickness of sheets	⅜ in.
" brick arch?	Yes.
" water space, width	Front, 4 in.; sides, 3½ in.; back, 3½ in.
Grate, kind of	Shaking, finger.

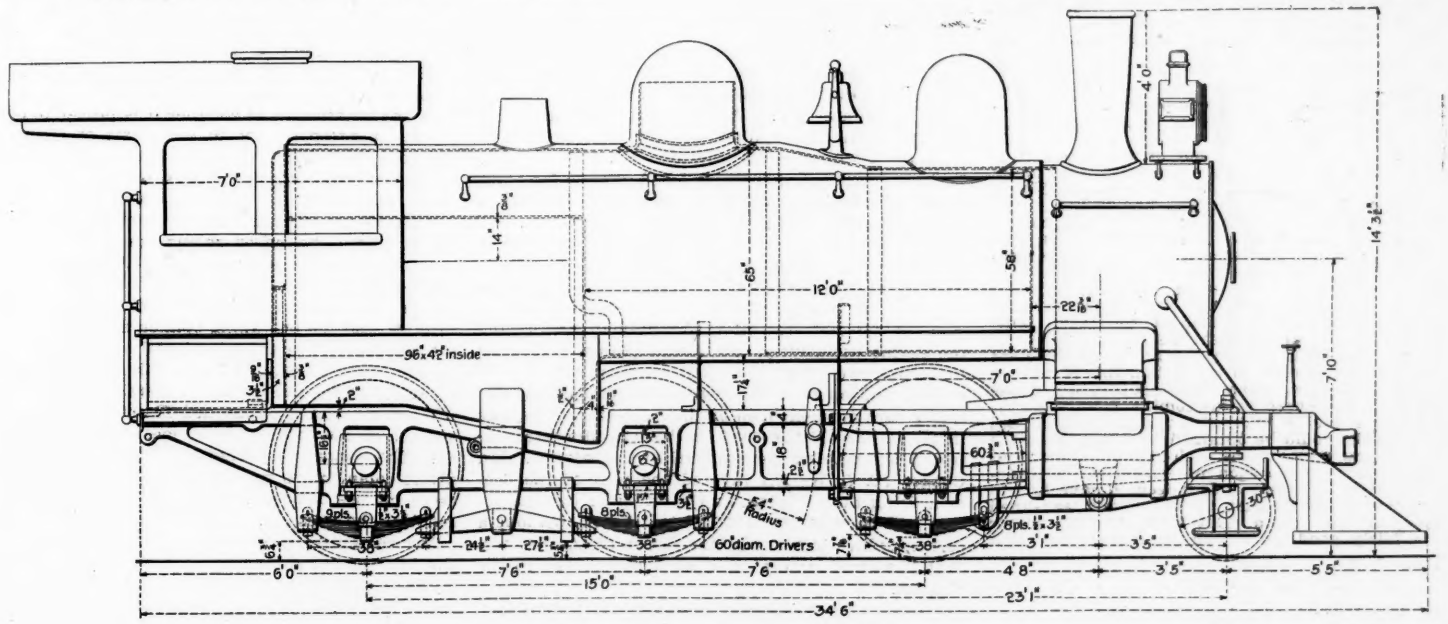
Exhaust nozzle, diameter	4¾ in.
" " distance of tip below center of boiler	2⅛ in.
Netting	Wire.
" size of mesh	2½ x 2½ No. 10.
Stack	Taper.
" least diameter	14 in.
" greatest diameter	17½ in.
" height above smokebox	4 ft. 4 in.

Tender.

Type	With swivel trucks.
Tank capacity for water	5,000 gals.
Kind of material in tank	Steel.
Thickness of tank sheets	¼ and ⅜ in.
Type of under-frame	Steel.
Type of truck	Standard Car Truck Co.
Truck with swinging motion or rigid bolster	Barber rolling device.
Type of truck spring	26-in. double elliptic.
Diameter of truck wheels	33 in.
Diameter and length of axle journals	4¼ x 8 in.
Distance between centers of journals	6 ft. 3 in.
Diameter of wheel fit on axle	5⅝ in.
Diameter of center of axle	4⅝ in.
Type of truck bolster	12 in. 30 lb. channels.
Type of truck transom	8 in. 11¼ lb. channels.
Length of tender frame over bumper timbers	20 ft. 4 in.
Length of tank	19 ft. 1 in.
Width of tank	8 ft. 8 in.
Height of tank, not including collar	5 ft. 3 in.
Height of tank over collar	6 ft. 6 in.
Type of back drawhead	M. C. B.
Without water scoop.	

Makers of Special Equipment.

Tires	Latrobe Steel Co.
Axles	Cambria Iron Co.
Sight-feed lubricators	Detroit Lub. Co.
Front and back couplers	Tower Nat. Malleable Cast. Co.
Safety valve	Crosby Steam Gage & Valve Co.
Sanding devices	H. L. Leech.
Injector	Hancock Inspirator Co.
Driver brake equipment	American Brake Co.
Tender brake equipment	Westinghouse.
Tender brake beam	Kewaunee—American Brake Beam Co.
Air pump	Westinghouse.
Air pump governor	Westinghouse.
Engine truck springs, Driving springs, Tender springs	National Railway Spring Co.
Valve " "	C. C. Jerome.
Pistol rod packings	C. C. Jerome.



Mogul Freight Locomotive – Chicago Great Western Railway.

Length over all, engine	34 ft. 7⅛ in.
" " " total, engine and tender	57 ft. 6⅝ in.
Height, center of boiler above rails	7 ft. 10 in.
" of stack " "	14 ft. 7 1/16 in.
Heating surface, firebox	153.56 sq. ft.
" " tubes	1,684.68 sq. ft.
" " total	1,838.24 sq. ft.
Grate area	28 sq. ft.
Tubes, number	270
" material	Charcoal iron
" outside diameter	2 in.
" length over sheets	12 ft.
Smokebox, diameter	58⅞ in.
" length	61 ⅞ in.
Exhaust nozzle	Single.
" "	Permanent.

The Microstructure of Bearing Metals.

Those who have followed the discussion of the microstructure of bearing metals in previous issues* will be interested in the paper by Mr. G. H. Clamer, Chemist of the Ajax Metal Co., of Philadelphia, read before the Franklin Institute and published in the August number of the journal of that society. In the review of the work already done, as given in the Railroad Gazette, particular reference has been made to the presence of oxides and phosphorus in the metals, and diagrams have been shown from magnified sections of a number of the alloys. Some general considerations from Mr. Clamer's address will add interest to what we have already printed on the subject:

The preparation of the alloys for microscopic examination is, of course, of first importance. They must be carefully polished and then etched with a suitable reagent. For copper alloys I prefer to use the method of Guillemin, i. e., to attack the specimen electrolytically by exposing it for a few minutes in a bath of very dilute sulphuric acid when connected with a simple Daniel cell, and, making a comparative study of metals of similar composition, all the conditions must be the same. The method I use is to make a platinum dish, containing the weak acid solution, the positive pole, and then immerse the specimens to be compared in the solution in contact with the dish, and pass a current through them all at the same time.

The white metal alloys are first in anti-frictional qualities, but do not wear well, and, furthermore, have not sufficient strength to support the great weight of locomotives and cars without distortion or crushing. The practice, therefore, is to use these metals inside of a stronger shell of composition metal.

In car bearings these soft alloys are simply used as a lining, which is not more than $\frac{1}{16}$ to ⅛ of an inch in thickness. The object of this lining is to give the bearings a good seat without having to be bored out accurately to fit the diameter of each individual axle.

* For previous articles, see the following issues of the Railroad Gazette for the current year: Feb. 25, p. 133; March 4, p. 157 (illustrated); March 25, p. 212 (illustrated); April 8, p. 249; May 13, p. 336 (illustrated).

The diameters of the axles vary according to the wear they have had, and to fit hard-metal bearings it would be necessary to bore each one to fit each particular axle, and, moreover, the axles are always more or less rough. The soft white metals easily conform to any such irregularities in the surface of the axle.

This soft composition soon wears away, but by the time this has taken place the bearing has a good seat on the axle, thus doing away with the necessity of fitting each separate journal. The boxes are all bored out to the same diameters and lined with a specified thickness of soft metal. In this way the bearings are all fitted with minimum expense and confusion. The principal alloy used is one containing antimony and lead; this is sold on the market under the name of "hard lead." It usually contains from 15 to 25 per cent. of antimony, which makes the alloy coarsely crystalline and brittle. It is inexpensive, but gives little wear. Although antimony is a more expensive metal than lead, the "hard lead," or antimonial lead, sells at a lower price than pure lead. The microstructure shows these coarse crystals (Fig. 1). With the increase of antimony the crystals are brought into closer contact, indicating the approach to the chemical alloy. Tin greatly improves this alloy. It gives it greater toughness, and makes an alloy which will stand a much greater pressure without distortion—a valuable feature for a babbitt metal.

This is the composition of nearly all the cheap babbitt metals on the market. A good babbitt metal should have as fine a grain as possible in connection with the greatest toughness and hardness obtainable. Tin has the property of greatly reducing the granular texture of antimonial lead. Bismuth in small quantity is added to the lead, antimony and tin alloy by some manufacturers. It is claimed to give greater fluidity and less distortion under pressure. The composition of such an alloy is:

Lead	80.00
Tin	4.75
Antimony	15.00
Bismuth	.25

The question of obtaining a fine-grained structure depends greatly on the method of manufacture, temperature of pouring playing an important part, but generally the size of the crystals increases with the increase of antimony, as does hardness; but by proper manipulation a finely crystalline metal can be obtained in an alloy of the following composition, which has a high percentage of antimony, thus making it a valuable babbitt metal:

Lead	70.00
Antimony	20.00
Tin	10.00

The first white metal successfully used as a bearing metal was invented by Isaac Babbitt. It contained tin, antimony and copper. This metal is used for lining purposes, but can be cast into solid bearings which do not carry too great a load. All white metals used for bearing purposes are now sold under the name of babbitt metal, and when used as a lining the bearing is said to be "babbitted." But to distinguish this metal from the cheaper lead alloys it is sold under the name of "Genuine Babbitt." This alloy is harder than the lead alloys, much tougher, and is finely crystalline and wears well. It is much more expensive, owing to the content of tin. The composition is as follows:

Tin	80.00
Copper	10.00
Antimony	10.00

Another alloy very successfully used is one composed of:

Tin	68.00
Zinc	31.50
Copper	1.00
Lead	.50

It is very tough and bends many times without breaking, due to the peculiar interlocking of the crystals. It has, however, the bad feature of pouring sluggishly. I have no knowledge of the wearing qualities of this metal.

I will next consider the miscellaneous alloys. Under this head may be included any alloy, it matters not what the composition, so long as it produces a reasonably good casting. It includes all alloys having over 60 per cent. of copper and the remainder made up indiscriminately of zinc, tin, lead, antimony and any other metals which happen to be in the scrap pile.

Such compositions as these are used on freight cars, and, indeed, by some roads in passenger service, their only aim being to get a cheap composition. No attention is paid to wearing or other qualities, and the running expense is not taken into account; it is only first cost. If a bearing gets hot or wears out, it is removed and thrown into the scrap pile, to be again remelted. Foundrymen receiving this scrap term it all "red brass," and without any knowledge of the composition again convert it into journal bearings.

The scrap pile always contains more or less zinc, and, indeed, anything from yellow brass up is considered good enough for a cheap bearing metal. A composition of two-thirds copper and one-third zinc is beautifully crystalline and the size of the crystals varies greatly with the method of treatment. Zinc has the property of giving greated solidity to alloys of copper, tin and lead, 1 to 2 per cent. being sufficient for this purpose, and when more than this is used in connection with other scrap the effect is more or less injurious. If the scrap metal coming from the railroads was first melted and run into pigs and analyzed uniform results could be obtained by building up the scrap with new metal to the desired composition; but the present low price of such material would not warrant this extra expense; and, indeed, I have known of such bearings to be cast, bored out and lead-lined for 7½ cents per pound. But even so, with proper care, a fairly good metal can be made from such scrap.

The Traveling Engineers' Association.

President D. R. McBain (Mich. Cent.) called the sixth annual meeting to order and introduced Mayor Diehl, of Buffalo, who welcomed the members to the city.

President McBain then read an address, from which the following is taken:

Rapidly increasing competition and consequent decrease in earnings make it imperative that locomotive management be of the most careful and economical character. We see or hear every day about new electric lines being built to compete with the steam roads, and the travel that was once the source of large revenue to the steam lines, and which incurred little if any additional expense to them, is now done by the electric lines, so that economy in everything is urgently necessary on the part of all in the service in order that the pioneers in the business may continue to prosper. The traveling engineer can, I believe, save for his company as much as any man of his rank in the service in the matter of fuel alone. I do not mean that he can accomplish this by his own personal efforts, but he can by a few simple figures illustrate to the men under his charge what they can do by saving two, four, six, eight or ten shovelfuls of coal daily; and by a disposition to at all times deal fairly with them and encourage them in their work, it will be found that they will, in most instances at least, put forth their best efforts to bring about the results desired. On a road where two hundred engines are in service daily, in our part of the country, a saving of two shovelfuls of coal by each crew means $6.40 a day, or $2,336 a year. I think you will all agree that if the men try hard they can save six shovelfuls each, and thus bring about a saving to the company of $7,008 a year, or interest at 4 per cent. per annum on $175,200.

The reports of the Secretary showed that the membership of the Association is 235 companies. The Treasurer's report gave the receipts for the past year as $1,246.39; expenses, $1,196.39; balance, $50.

The report on "What Is the Best Method to Be Pursued by Traveling Engineers in Giving Air Brake Instruction While on the Road," published last week in abstract, was read by Mr. C. B. Conger. Mr. Wallace (N. W.) said that on his road the engineman is examined on machinery and air brakes before he is allowed to take charge of an engine, and he must show positive knowledge of the working of air brakes. It is not, however, the man who possesses the most knowledge that does the best and smoothest work; but the one who takes the most pains with his work. Mr. Turner (Wis. Cent.) said that he had found in long trains of 50 cars brakes will release much more promptly with a heavy reduction than with a light reduction; from the fact that in releasing brakes it is the auxiliary reserve pressure which has to be overcome, and with a heavy reduction that pressure is certainly reduced, which leaves a lessened pressure to overcome in order to release the brakes. Mr. Davis (Ill. Cent.) remarked that all enginemen do not brake an engine in the same way. The fireman who is about to be promoted, is taught all the appliances in detail, so that he can go through the engine and cars and trace the air and the appliances, and show what is the special purpose of each working part, and the road had a servicable equipment for giving this instruction. If after the new engineman is on the road he makes a poor application, at the end of the trip he receives further instruction. Mr. Crane (Sante Fe) stated that their enginemen were instructed to make the test of the air hose at terminals with not less than 60 lbs. of air, and they have ironclad rules on that point. Mr. Davis (Ill. Cent.) said that his road had ten different plants for testing and repairing air brake equipment, outside of Chicago; they have a 50-ft. piece of hose attached to the air reservoir, which they connect to the train pipe and couple the cars in both directions, and have an engineer's valve, and make the test with the same results as if the cars were attached to an engine.

The general conclusion was that if it were necessary to call the engineman's attention to bad practice in handling the brakes it should be done at the end of the trip.

The report on "How Can the Traveling Engineer Best Instruct and Assist the Fireman in the Economical Firing of the Engine," and abstracted last week, was read by Mr. C. F. Keith.

Mr. Wallace (N. W.) inquired whether it was good practice to allow only the firemen to look after the working of the injector. Mr. Turner (Wis. Cent.) answered that their road had gone so far as to request the enginemen to allow their firemen to control the injector, and this was done economically. Mr. Montgomery (C. & N.) remarked that they had obtained good results from allowing the firemen to use the left-hand injector. Mr. Bauder (L. S. & M. S.) did not agree that it was economical to allow the fireman to "pump" the engine exclusively. Mr. Crane (Sante Fe) stated that on a part of their road the fireman pumped the engine, and on part the engineman pumped it. In riding with different men on different engines he was firmly of the opinion that the best results were obtained when an engineman worked the injector. Mr. Conger (C. & W. M.) favored the idea of the firemen doing the pumping, as the duties of the enginemen had been so increased of late years, without a corresponding increase in the duties of the firemen, that it seemed natural this work should fall to the fireman.

A committee was finally appointed on the subject, and during the session reported that they believed the engineman to be the one party responsible for the care and maintenance of the locomotive while on the road, and in consequence did not deem it advisable to recommend that the feed-water apparatus be handled by the fireman. They believed further that the question can best be settled by each individual engine crew.

On Wednesday morning the first report discussed was that on the location of fixed signals. The committee on this subject presented a report setting forth that as it costs money to stop a train and start it again, or even to check its speed, signals should always be so located that the engineman can see them in ample season to be able to keep on full steam if the signals are against him. Where signals are situated in an obscure position enginemen are often in doubt whether to reduce speed or to take chances; they do take chances, and after having done this for a number of times with safety they are likely to go on doing so, and then sooner or later the inevitable will happen and the wrecking crew will be needed.

Mr. Meadows (N. Y. C.) said that on his road a good many poorly located signals had been changed so that they could be more easily seen, and the improvements, consisting of better backgrounds, and in some cases taller posts, had been of decided benefit in getting trains over the road on time. Mr. Crane (A., T. & S. F.) spoke of the delay caused by the unnecessary display at interlocking plants and elsewhere of red signals with which the engineman has nothing to do, but which will cause him to shut off steam and perhaps lose time; or perhaps the engineman will come to have insufficient respect for a red signal. Mr. Brown (C. & O.) agreed with Mr. Crane; at a certain point on his road trains are delayed by a red light belonging to a parallel railroad. Mr. Cass (St. L. & S. F.) recommended the use of different shapes for form signals on the main line from those used for side tracks.

Mr. Niles (Supt. L. S. & M. S.) advocated the use of position signals distinguished from color wherever possible, but at night he would use a colored light instead of a white one to indicate all clear.

The meeting adopted a resolution recommending that red lights not governing the movement of fast trains be placed out of sight of such trains as far as possible.

At the afternoon session the report of the committee on "The Uniformity of Cab Fittings and Their Arrangement with a View to Accessibility and Utility" was taken up. Mr. Meadows (N. Y. C.) said that it had been his experience that a non-lifting injector required more attention to adjust it and start it working than a lifting injector, and with a lifting injector on the right side the arrangement does not take the engineman's attention from other matters which he should be looking after while he was applying the injector. Mr. Currie (Nathan Mfg. Co.) thought it was a matter of choice on the part of the master mechanic as to the side the lifting injector should be on. Mr. Nellis (West. A. B. Co.) thought there might be a reason why the non-lifting injector should be used on the right side. Mr. Owens (L. V.) said that on Wooten boilers an injector on the left hand side would be very handy to work, on account of the cab being in the centre of the boiler. Mr. Conger (C. & W. M.) thought it was proper to have the lifting injector on the engineman's side, and where it was necessary to use a non-lifting injector to put it on the fireman's side. Mr. F. M. Smith (Hancock Inspirator Co.) remarked that there was not enough attention paid to the location of the injectors as a matter of convenience. The boiler is built and the fittings put in, and then a place is found for the injector. There were too many crooks and elbows in the pipe leading to the injector. More is required every year of the injector, and yet the water passages have been cut down to 1¾ and 1⅞ in., and the engines do not get the water demanded. It is almost impossible for an injector with this confined pipe to supply 3,500 to 4,000 gallons of water per hour required by the heavy type of engine. His experience with injectors had satisfied him that an injector should be placed so that the bottom of the injector will be on a level with the top of the tank.

On the question as to whether it is proper to couple the steam pressure pipe to the turret or directly to the boiler head, Mr. Henretta (N. & W.) offered a resolution that where the steam turret is sufficiently large, that is the proper place to attach for steam for the lubricator, and that the opening of the turret leading from the boiler should equal the combined area of all openings leading from the turret; which was adopted.

There was considerable discussion on the use of the throttle, and the prevailing opinion seemed to be that the ratchet on the throttle should be so made as to enable the engineman to place the throttle at any point he wished and to hold it there.

When the meeting convened Thursday morning the subject of the lubrication of locomotives was taken up. There was a very lengthy discussion, bringing out diverse opinions on many of the debatable questions, as to the use of oils. A committee was appointed to consider the question.

The committee recommended that the bearings at the back end of the main rod be carefully fitted and filed so as to be free of the bearing at the joints of the brasses and for a distance not less than half an inch from that point. The size of the oil hole in all rod brasses should be as large as the oil hole in the strap and recommended with proper limitations that the engine oil be used for all rod bearings. In the case of a pin becoming heated valve oil should be used for the time being. Engine oil was also recommended for eccentrics, to be supplied through a cup similar to that used on rod bearings. An oil cup is also recommended on rocker boxes for guides and on

the top guide and front end of the main rod. An independent oil cup for the bottom guides was deemed to be unnecessary. It was further recommended that three oils of a constituency such as will flow freely at atmospheric temperature be required. It was further recommended that the tender truck journals should be inspected each trip in order to see that the packing is saturated with oil and kept in close contact with the journals. The best results are obtained by having this work done by special men. It was also recommended that a swab be used to keep the piston rods and valve stems clean and lubricated. It will be found a valuable aid toward keeping cylinders, pistons, piston rod packing, valves, valve seats and valve stems in good condition, to keep the main throttle valve slightly open when going into stations or down long grades, as it overcomes the vacuum forming tendency of the main pistons and prevents the drawing into the cylinders and steam chests of the smoke-box gases. The committee believed it was a good practice to groove the face of the piston packing rings, with the object of reducing the area of the surface of the ring in contact with the cylinder surfaces, as well as forming a partial balance to the piston and a receptacle for oil. Enginemen are advised not to stir up the packing on the top of driving boxes, as it has been found to result in the heating of those journals owing to the dirt which accumulates there being carried with the oil into the oil holes and on to the journals. The practice of carrying engine oil cans on or in close contact to the boiler during the warm season is not recommended.

At Friday's session Messrs. Mooney (L. V.), Taylorson (W. N. Y. & P.) and Belton (C. & O.) were appointed a committee to prepare resolutions of thanks for courtesies received at the meeting.

The last committee report was then taken up on "The Use of Water on Hot Bearings of Engines and Tenders. Is it Advisable, and to What Extent Used? In Using Water for Hot Driving or Engine Truck Boxes Is It Used on Top or Side of Box?" This report received very brief consideration, and on motion the subject was continued until the next meeting.

Officers for the ensuing year are: President, D. R. McBain (Mich. Cent.), Jackson, Mich.; First Vice-President, P. H. Stack (U. P.), Council Bluffs, Ia.; Second Vice-President, Charles Davies (Erie), Buffalo, N. Y.; Third Vice-President, C. P. Cass (Frisco), Monett, Mo.; Secretary, W. O. Thompson (Lake Shore), Elkhart, Ind., and Treasurer, C. A. Crane (Santa Fe), Fort Madison, Ia.

Executive Committee: J. R. Belton (C. & O.), Covington, Ky.; C. B. Conger (C. & N. W.), Grand Rapids, Mich.; I. A. Brown (C. & O.), Covington, Ky.

The next meeting will be in Cincinnati, O., the third Tuesday in September, 1899.

The following firms made exhibits at the meeting:
Detroit Lubricator Co., represented by W. E. Bryant.
Hancock Inspirator Co., represented by F. P. Smith.
Metropolitan Injector, represented by N. L. Hayden.
McVicar & Sweet, Denver, represented by D. L. Sweet.
Peerless Rubber Co., represented by C. S. Prosser.
Manning, Maxwell & Moore.

The Congo Railroad.

The correspondents of European newspapers who were present at the celebration of the opening of the Congo Railroad give some interesting particulars. One writes to Figaro: "There were phenomenal difficulties to overcome. All kinds of burdens could be intrusted to the blacks, who carried them on their heads, but to let one have a package was not to be thought of. Three hundred Chinese were brought in from Macao; three months later only 160 of them survived. The negroes from Barbados and Jamaica who had endured the work on the Panama Canal died like flies. Only men from the West African coast, and especially Senegambians, proved hardy, and they were costly. A Senegambian laborer on earthworks earned as much as 10 francs a day. The line is a light one, of only 75 centimetres (29½ in.) gage; all costly structures have been avoided, and grades and curves are used which are unknown in Europe—4 per cent. grades and curves of 55 metres (180 ft.) radius. A 30-ton locomotive hauls but three cars of 22,000 lbs. capacity each. With European rates, the working of such a road would be folly, but it must be remembered that here human carriers are the only means of transportation, and that it takes an average of 30 days for one to carry 66 lbs. on his head from Matadi to Stanley Pool. This costs 1,500 francs a ton, and the railroad carries it for 1,000 francs." But the correspondent fails to observe that there is very little merchandise that will bear a charge of 1,000 francs per ton—$8.82 per 100 lbs.—for transportation.

To the Monde Géographique a correspondent wrote: "The lack of accommodations and of fresh provisions, the debilitating effect of the temperature, which among these barren ravines and precipices, destitute of vegetation, is extraordinarily high, the difficulty of the work, and dangerous diseases, such as dysentery, swamp fever and black-water fever, caused an excessive mortality. Within 18 months, out of 4,500 laborers, 900 died, and the number of invalids was much greater, and every steamboat carried away hundreds. The remainder were terrorized, revolted and deserted. Demoralization and despair filled the black laborers and destroyed them."

Aug. 13, "founders'" 500 franc shares in this company were quoted at 1,225 francs on the Brussels exchange. The Belgian Government holds 15,000,000 francs of the shares, so its profits were reckoned at 21,750,000 francs.

Poor's Statistics of the Railroads of the United States.

In our issue of Sept. 2, page 630, appeared statistics of railroads of the United States to June 30 for the years 1897, 1896 and 1895, as compiled by the statistician of the Interstate Commerce Commission. We now have advanced sheets of the introduction of "Poor's Manual" (the complete work will be ready for distribution in a few days) giving statistics for the railroads for the same years, except that in Poor's compilation the reports are made to the close of the respective fiscal years of the companies. As the custom of ending the year on June 30 is becoming more and more general, the statistics and the two compilations became more nearly comparable.

Poor reports the miles of railroad in 1897 as 179,693, omitting all switching and private roads not reporting operations. The Interstate Commerce statistician makes the miles of railroad completed 184,428, a difference of 4,736 miles, which we suppose is partly accounted for by specific omissions made by Poor. This omitted mileage must at any rate be considerable, for Poor reports 1,272 miles more railroad in 1895, when the switching railroads were not omitted, than in 1896, when they were omitted; counting in the actual increase of mileage in that year, the omissions must account for about 3,000 miles. Poor shows an increase, notwithstanding this omission, of 16,334 miles from 1890 to 1897.

The Interstate Commerce statistics cover 183,284 miles operated; Poor covers 181,133. In both reports this item is larger than "miles completed," as numerous companies run trains on the tracks of other companies, while the same track is used by and reported on by the owning company.

The total track reported by Poor is 236,911 and by the Interstate Commerce Commission 243,444 miles. It is interesting to observe that there were still almost 25,000 miles of iron rails in the track, as compared with 40,694 miles in 1890.

We give below some of the principal totals from the introduction to the Manual:

	1897.	1896.
Miles of railroads	179,692.57	178,549.33
Miles of track	236,911.52	235,482.79
Locomotive engines	35,810	36,080
Cars, passenger	25,275	24,788
Cars, baggage, mail, etc.	8,133	7,839
Cars, freight	1,229,335	1,240,061
Total revenue cars	1,262,743	1,272,688
Capital stock	$5,453,782,046	$5,290,730,567
Bonded debt	5,411,058,525	5,426,074,969
Unfunded debt	374,389,673	339,502,302
Current accounts	392,481,496	386,382,440
Total liabilities	$11,631,711,740	$11,442,690,278
Excess of assets over liabilities.	299,901,913	364,806,935
Totals	$11,931,613,653	$11,807,497,213
Cost of RR. and equip.	10,029,151,607	9,963,767,710
Real estate, stock, bonds and other investments	1,509,841,062	1,450,418,025
Other assets	222,089,700	231,915,121
Current accounts	170,531,284	161,396,357
Total assets	$11,931,613,663	$11,807,497,213
Miles operated	181,132.70	180,891.19
Rev. Train Mileage:		
Passenger	342,464,408	337,641,115
Freight	500,326,372	497,248,296
Mixed	15,235,049	15,785,433
Totals	858,026,179	850,674,844
Passengers carried	504,106,525	535,120,750
Passenger mileage	12,494,958,000	13,054,840,243
Tons freight moved	788,385,448	773,868,710
Freight mileage	97,842,569,150	93,885,853,634
Earnings:		
Passenger	$253,557,936	$265,313,258
Freight	780,351,939	770,424,015
Miscellaneous	89,636,791	89,894,754
Totals	$1,123,546,666	$1,125,632,025
Net earnings	338,170,195	332,333,756
Receipts from other sources	95,013,907	104,007,542
Total available revenue	$433,184,102	$436,341,298
Payments:		
Rentals, tolls, etc.	$58,600,768	$59,081,058
Interest on bonds	231,046,819	242,415,494
Other interest	5,633,298	7,996,456
Dividends on stock	82,630,989	81,364 854
Miscellaneous	28,124.474	34.233,688
Total payments	$406,036,348	$425,091,550
Surplus	27,147,754	11,249,748

The introduction to the Manual contains the usual full tables, for the 12 preceding years, for each of the eight groups into which Poor divides the country. For the whole country the average freight ton rate per ton per mile was 7.98 mills, as compared with 8.21 in 1896. The average passenger rate was 2.029 cents per mile, as compared with 2.032 in 1896, and the average passenger train load was 36.49 passengers, a decrease of 2.17 from 1896. It will be observed that, while the total freight earnings increased nearly 10 millions (1.29 per cent.), the passenger earnings decreased over 11¾ millions (4.43 per cent.). The total gross earnings show a slight decrease, $2,085,359, equal to one-fifth of one per cent.

The average freight train load increased from 180.81 in 1896 to 195.56 in 1897.

The total gross and net earnings per mile of road and average dividends, etc., were as follows:

	1897.	1896.	1895.
Gross earnings	$6,203	$6,223	$6,097
Net earnings	1,867	1,837	1,804
Per cent. of expenses to earnings	69.91	70.48	70.41
Dividends paid on total stock, per cent.	1.52	1.54	1.58
Interest paid on total bonded debt, per cent.	4.27	4.47	4.24

Poor this year separates the railroads of the country into six classes, as follows: Class 1 comprises all lines that may be designated "common carrier railroads" in the full sense of the expression; Class 2 is made up of railroads that are engaged in carrying passengers only; and Class 3 those exclusively engaged in the transportation of freight; Class 4 comprises switching, belt, terminal, connecting and toll railroads; Class 5 consists of private, logging, ore and other railroads used in conjunction with the enterprises with which they are connected; and Class 6 includes roads not fully brought into operation, and those whose operations are not fully reported. The aggregates for these classes for 1897 are as given in the accompanying double column table. In the other table the returns of classes 4 and 6 are omitted in order that the general result may be uniform with the recapitulations of former years.

RAILROADS OF THE UNITED STATES, 1897.

	Class 1.	Class 2.	Class 3.	Class 4.	Class 5.	Class 6.	Total.
Mileage of railroad owned	179,128.19	79.69	268.29	580.13	241.93	3,248.84	183,547.07
Capital stock	$5,442,995,389	$1,737,600	$6,427,607	$94,763,952	$2,621,800	$72,794,299	$5,621,340,647
Bonded debt	5,398,572,925	830,100	3,939,500	81,628,917	2,115,000	28,969,850	5,516,056,292
Cost of RR. and equipment	10,010,830,761	2,870,050	9,420,733	179,884,770	6,030,064	95,185,101	10,304,221,479
Other assets	2,067,296,570	385,595	2,332,335	15,223,647	394,134	9,876,177	2,095,508,458
Total assets	$12,078,127,331	$3,255,645	$11,753,068	$195,108,417	$6,424,198	$105,061,278	$12,399,729,937
Miles of railroad operated	180,552.97	68.19	287.07	741.37	224.47	.....	181,874.07
Passengers carried	501,538,342	2,568,183	.....	21,498	.....	.....	504,128,023
Passenger mileage	12,481,509,189	13,448,811	.....	107,490	.....	.....	12,495,065,490
Tons freight moved	780,981,900	.....	3,079,274	10,342,193	3,766,360	.....	798,169,727
Freight mileage	101,416,680,004	.....	29,475,379	195,182,322	30,092,942	.....	101,671,430,647
Earnings, passenger	$253,287,713	$270,223	.....	$600,880	.....	.....	$254,157,816
Earnings, freight	772,188,082	.....	820,798	5,322,765	475,924	.....	778,807,569
Total, inc. miscellaneous	$1,121,969,166	$270,69	$824,978	$9,319,960	$481,824	.....	$1,032,966,485
Net earnings	337,699,021	33,511	286,044	4,621,835	151,629	.....	342,792,040
Receipts from other sources	94,884,224	51,107	39,332	2,617,409	39,242	.....	97,631,314
Total available revenue	$432,583,245	$84,618	$325,376	$7,239,244	$190,871	.....	$440,423,354
Interest on bonds	230,842,982	35,875	78,634	2,728,763	89,325	.....	233,775,579
Dividends on stock	82,534,742	26,115	42,624	143,429	27,508	.....	82,774,418
Total of all payments	$405,677,314	$83,283	$139,013	$6,524,002	$136,737	.....	$412,560,349
Surplus	26,905,931	1,335	186,363	715,242	54,134	.....	27,863,005

Foreign Railroad Notes.

The Austrian Minister of Railroads has given orders bearing on the general question of the requirements that work in the offices of the Ministry shall be suspended on Sundays, New Year's Day, Corpus Christi and Christmas.

The Prussian State Railroads in the last half of this year were to let contracts for 1,000 locomotives. Before the end of August contracts for 590 of these had been given out to six Prussian works for an aggregate amount of some $7,500,000. They are to be delivered between March and December of next year.

It is reported that the Belgian Minister of Transportation, "following the example of Sweden and Norway," has determined to grant one free pass for all the state railroads (some 3,500 miles) to every newspaper in the country, in the interest of news collection—we all know what that means. Further it is reported (but this is hard to swallow) that the Belgian Press Association is intrusted with the duty of preventing the misuse of this privilege. This is as if the Association of Old Topers were to be intrusted with maintaining moderation over a barrel of free whisky.

The first "Austrian Universal Accident Insurance Company" has just brought out a railroad accident insurance policy which requires the payment of only one premium. This policy protects for the whole life against railroad accidents without regard to age, sex or occupation. All railroad and station employees are, however, excluded from its benefits. The policy is valid not only in Europe, but in all countries, and grants to the insured (1) in the case of death by a railroad accident, the payment of the whole sum named in the policy to the heirs; (2) in case of permanent disability the insured is to receive an income for life; (3) in case the injury is such as to completely disable for a time there will be paid up to 200 days, one-third of one per cent. of the amount insured. The policy covers accidents on all lines running public conveyences for the carriage of passengers, including narrow-gage, electric, cable, elevated and underground roads. The single premium covering all the things above specified costs about three-tenths of one per cent. of the sum insured.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns pesent only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or n consideration of advertising patronage*

The discussion at the Railway Signaling Club on distant signals is reported in another column. Our report is short, but it is long enough to show that the men in charge of signal departments, like most other men, keep their point of view close to the needs of their own service. For a member to get up and say that a distant signal is useless and perhaps dangerous, sounds startling; and the remarks of Mr. Elliott, though they do not corroborate this view (as at first they may seem to do), show that he probably has, on his 6,000-mile road, many more home signals to which he does not want distant signals added than he has so situated that he does want them reinforced by distants. It will be observed, too, that the speakers at Chicago had in mind chiefly crossing signals. In view of the fact that many of the crossings which they had in mind are on very "thin" railroads, it is evident that the conditions under which the subject was discussed are radically different from those where most of the distant signals now in existence are to be found. Distant signals were originally used by the English and by American railroad men in the Eastern States, because the necessities of fast trains and of good discipline compelled their use. To slacken speed so as to make sure that the home signal was all-clear simply wasted time that could not be spared. Enginemen have in thousands of cases taken more or less risk (and, no doubt, there are many places where they do so now) by only partially obeying the rule requiring speed to be slackened sufficiently to enable the train to be stopped at the home signal if it is found at danger; but if discipline is to be maintained—that is, if the rules and the practice are to be made to conform to one another—and fast schedules are to be adhered to, the signals must be such as to remove the temptation to take this risk. Probably the gentlemen who brought up this topic have a good many crossings—and other places—where they find it easier to give the trains a little additional time than to maintain distant signals, and to so discipline their men as to get the full benefit of the signals. No one can object to this; but theories based on this kind of practice should not be put forth as general principles, applicable to distant signals everywhere.

The Outlook for Rolling Stock Orders.

In order to make a little forecast of the outlook for locomotive and car building among the railroads of the United States, we have addressed letters to a number of important railroads, and the replies received may be taken as indicating pretty well the situation for the rest of this year. Our inquiry was as to the likelihood of ordering equipment during this calendar year. Railroads operating 29,000 miles, with an equipment of 7,500 locomotives and of 300,000 cars, will probably buy before next January 74 locomotives, 6,000 freight cars and 40 passenger cars. Of the freight cars, 1,000 are to be of steel. Since the replies to our letters were received, 1,350 of the freight cars have been contracted for. Companies operating about 14,000 miles and owning about 134,000 cars, expect to give some orders, but were so uncertain about it that their figures have not been included in the above. Further than this, certain private car lines expct to buy 735 cars.

Electric street railroads operating 5,500 cars will buy 620 new cars.

Nine railroads now building, with a proposed mileage of 920 miles, expect to order before the end of 1898 38 locomotives, 1,650 freight cars, 162 passenger cars.

A considerably larger number of steam railroads than those mentioned above, namely those operating 64,000 miles and owning almost 500,000 cars, will buy no new equipment before January 1st.

Very little new rolling stock will be bought by railroads in Canada and Mexico during the rest of this year.

The replies received represent 58 per cent. of the total mileage and 72 per cent. of the total equipment of the steam railroads of the United States. The roads not included are nearly all short lines and their requirements, if any, would not much change the percentages.

Railroads which gave definite figures own 23 per cent. of the total equipment, and those which will buy no new rolling stock own 38 per cent. of the total equipment. We can safely say that at least 10 per cent. of those not represented will not be in the market this fall. This would make the figures given equal 71 per cent. of the total requirements of all the railroads in the United States. Figured on this basis American builders of steam railroad equipment will perhaps receive orders for 96 locomotives, 7,639 freight cars and 50 passenger cars, in addition to what may be bought by the railroads now building, which are an uncertain quantity, and the private car lines.

Some Suggestions from a Collision.

There is one feature of a recent collision that demands a moment's attention. We refer to the statement that the engineman who at Sharon ran his engine into a passenger car with such momentum that the car was split open its whole length, was one who had had but little experience on passenger trains. Whatever the peculiarities of this particular case, this one fact constitutes a general lesson from this disaster which must appeal to every superintendent and trainmaster.

Engineman Getchell had been a runner only five and a half years, had not passed a perfect examination on the management of air brakes, and was usually employed on a yard engine, where important questions of practice incident to high-speed running and to working the air brake never came before him. Plainly, the main lesson of this disaster is one of discipline.

We say this because inexperience has been an element in causing such accidents so many times before. The causes of collisions and other train accidents, as published in this country, do not generally come out in sufficient detail to include the particulars of the negligent employee's previous service, but in the official investigations made by the Board of Trade in England, where the records of the men are carefully inquired into, the fact that a blundering engineman or signalman had been in service at that particular place only a few days appears so frequently as to attract notice. One of the most notable recent accidents in England, the midnight derailment of a double-header fast express at Preston (Railroad Gazette, Nov. 13, 1896, p. 790), was an instance of this kind. We had occasion to notice a similar circumstance in connection with the rear collision at Tupelo, Miss., in June last, in which four soldiers were killed. It is in telegraph offices or signal cabins, oftener than on locomotives, that we hear of grave and delicate duties being intrusted to men who have not been thoroughly trained;* but in either place the risk is great; and a disaster due to this cause is peculiarly deplorable, for the reason that generally it is perfectly clear what the preventive measures ought to have been.

Every road has its emergencies, in which the superintendent is put to his wits' end to decide how far he can intrust the management of trains and signals to men whose experience is more or less inadequate. But, as a general proposition, it must be remembered that this is a question of degree. It all comes back to the fundamental principle that at all times the number of supernumerary men for all places of responsibility should be just as large as can be afforded; the highest standard of qualification for enginemen—for instance—should be enforced just as far down toward the fireman's grade as it is possible to carry it by constant training and catechising, and by getting men to study.

Much progress has undoubtedly been made in raising standards of personal qualification on American railroads during the past dozen years. Many roads have taken steps to improve the telegraph service by more strictly regulating the admission of learners and the promotion of operators. Catechetical examinations have effected great improvement in the train service, especially among the men who handle and care for the air-brake apparatus. But superintendents still have so much to say about their lack of success in getting train employees to obey orders, that it is plain that there is yet room for improvement. A comparison (in the monthly accident record) of the blunders made by freight train men with those made by passenger train men will show plainly enough that there must be still in the service a considerable proportion of second-rate and third-rate men. Every superintendent intends to have all these enginemen constantly improve themselves; but could not the improving process be accelerated? One thing is very patent: the best records of freedom from negligent acts are made by certain enginemen—every superintendent can name them—who by nature or training are clear-brained, alert and studious; and nothing lower than the example set by these men is a suitable standard for the other men. And another fact is equally certain, though not so obvious: that good records made by men who are known not to be thoughtful, vigilant and skillful are due to good luck, which no capable superintendent will deliberately depend upon. The only rational standard is to change all third-rate and second-rate men to first-rate as fast as possible. What justification has a single-track road for employing any less reliable and expert enginemen on freight than on passenger trains?

Of course, we do not need to tell any superintendent what the conditions are on his own road; but it may not be out of place to call attention to the fact that unsatisfactory conditions exist on many different roads, and to the likelihood that the public, in condemning railroads for shortcomings, will look upon the railroads of the state or county as a whole, so that one road is likely to suffer to some extent for the errors of another. When a yard engineman is found in charge of a passenger train and is shown to have only 70 per cent. of a thorough knowledge of the air-brake, people will ask whether or not such practice prevails at a hundred other places; and the superintendent who allows no engineman to be assigned to a passenger train unless he has a certificate of long service and of having been critically examined (including a 100 per cent. rating on the air-brake), may well take care, not only to assure himself that his orders in this direction are carried out, but to let his high standards be known to the world. His duty toward his own reputation demands it.

State Regulation of Railroads in Great Britain.

In our last issue we sketched an interesting change which is taking place in the railroad world of England, the practical consolidation of the two principal lines from London to the southeast, controlling a large share of the traffic to and from the Continent. Another question of the day among Englishmen which is equally important, as looked at from the standpoint of public policy, is that concerning what is known as the Fishguard & Rosslare scheme. Fishguard is a harbor with great physical advantages on Cardigan Bay, in the extreme southwest of Wales. It was selected more than 50 years ago by Brunel as the natural starting point for vessels between England and Ireland. Rosslare is some 55 to 60 miles off across the Channel, in Ireland. It is situated eight miles south of Wexford and also possesses great natural advantages. Hitherto almost the whole of the express traffic between England and central and southern Ireland has gone by way of Holyhead and Dublin, which is the same as saying that the London & North Western has had a monopoly of it in England and the Great Southern & Western in Ireland.

A few years ago Brunel's project of utilizing Fishguard was revived; a company was formed which proceeded to build a pier at Fishguard and a railroad to reach it, and bought up the harbor at Rosslare. The scheme had in it elements of great promise, but the small company found difficulty in raising money, especially as the Great Western Railway, which alone could give it access to London and all parts of the south of England, and without whose active support it could hardly hope to succeed, was, if not actually hostile, at least coldly neutral. Sud-

*For example, Atlantic City, July, 1896; Harrisburg, June, 1892.

denly last spring it was rumored that the control of the Fishguard & Rosslare scheme had passed into Great Western hands; and the rumor proved true. From the investigation of a very strong House of Commons committee, which has just reported, it appears that the officers of the Great Western acted in the matter with such celerity and vigor that their conservative neighbors began to think that they had been taking lessons in America. Having made up their minds to take up the Fishguard scheme, they sent for a well-known financier and gave him a free hand to obtain control of the enterprise, promising to indemnify him for his expenditure as soon as Parliamentary powers to devote Great Western capital to the purpose should have been obtained. He therefore personally bought almost the entire stock of the Fishguard company. Then the Great Western agreed with the Great Southern & Western, the only rich and powerful company in the south of Ireland, that the two roads should jointly buy certain small local railroads and build others, so as to form a complete new through route from Rosslare to Waterford, Cork, Queenstown and the whole southwest coast.

To this scheme Parliament has now given its sanction, but not without imposing stringent conditions in the public interest. In the first place, the participation of the Great Southern, which hitherto has, naturally enough, endeavored to direct all cross-Channel traffic through the port of Dublin, as thereby it secured the longest haul, was regarded with great jealousy in the south of Ireland, and especially by the inhabitants of the seaport towns of Cork and Waterford. And this jealousy was intensified by the fact that the Great Southern had entered into preliminary agreements to buy up two independent companies which connect Waterford with the interior, the Waterford & Limerick and the Waterford & Central Ireland. At the outset the House of Commons committee endeavored to obtain from the promoters a promise that these projects of purchase should be abandoned. Failing in this, the committee demanded and obtained pledges that nothing should be done or attempted which would be a substantial amalgamation, without coming to Parliament; that, whether the amalgamations were sanctioned or not, the Fishguard scheme should still be pushed forward, and that in the meantime nothing should be done either by the Great Southern or by the Great Western to weaken the competitive position of these two small companies. The committee went further and "expressed a unanimous opinion" that, though Parliament could not finally decide on amalgamations which were not formally before it, "in the interests of the south of Ireland they would regard with grave apprehensions" the absorption of the Waterford & Limerick and the Waterford & Central Ireland by the Great Southern. "Should either of these companies become too weak to stand alone, an amalgamation with some large road other than the Great Southern & Western would seem preferable in the interests of competition."

The committee further insisted that on the joint board of management of the Fishguard line the Great Western should have the majority of votes; and it gave to the Dublin, Wicklow & Wexford, which by a junction with the proposed new line near Wexford will be able to offer an alternative route from Cork and Waterford to Dublin, statutory rights to the fullest facilities for through traffic, with power to an arbitrator to permit the D., W. & W. to run its own trains over the line if these facilities were not honestly given. Further, the committee went so far as to insert a clause, more stringent probably than anything of the kind ever before adopted, giving the Treasury—which in return remits a debt of £93,000 charged upon one of the small lines to be absorbed—power to call at any time for lower rates or better service over the new route, and in case of non-compliance to take the matter before the Railway Commissioners, who will have the full power of a court of justice to enforce any order they may see fit to make. Lastly, the committee has bound the two companies jointly to make an important and expensive connection across Cork, which at present has five separate and disconnected stations, and the Great Western separately to continue to run between Waterford and South Wales a service of steamers at least as good as that which it is running at the present time.

This episode shows that in England the belief in competition as the best means of protecting the public interest is not, as it is often said to be, dead. And it is a good illustration of the masterly diplomacy by which Englishmen secure specific concessions to the public from an individual company, in return for statutory permission to take some particular step which the company desires to take for its own pecuniary advantage. Whatever may be his abstract opinion on the question of state ownership or direct executive interference with railroad management, no fair-minded observer will deny that in this case the House of Commons Committee has by the adoption of the humbler method of driving a bargain succeeded in securing very real and great advantages for the British public.

Annual Reports.

Northern Pacific.—Perhaps no report this year shows more noteworthy results than that issued by this company. The property was reorganized and the new company took possession on Sept. 1, 1896. The revenue was enough to justify the beginning of dividends on the preferred stock of $75,000,000 last winter. In the fiscal year just ended, the company, on gross receipts of $23,679,718, earned enough net to pay over $6,000,000 bond interest, $3,000,000 preferred dividends and a balance of $2,897,875 above these requirements. Approximately, the increase in the year to June 30 was $4,598,000 in gross, and $4,233,000 in net. This result is due to the very low ratio of operating expenses. In 1898 this figures out as 46.9 per cent., exclusive of taxes, against 61.28 per cent. last year.

The summarized income account follows:

Gross earnings	$23,679,718
Operating expenses	11,095,371
Net earnings	$12,584,347
Additions and improvements charged to income	811,709
Taxes	682,800
Balance	$11,089,838
Add dividends and interest received	887,197
Revenue available for interest and dividends	$11,977,135
Interest on bonds	6,079,160
Preferred stock dividends (4%)	3,000,000
Surplus	$2,897,875
Surplus June 30, 1897	489,829
Total surplus	$3,387,704

Out of the accumulated surplus as above stated, the Directors have set aside $3,000,000 as a guarantee reserve fund for the continuity of dividends on the preferred stock at 4 per cent. a year. This fund is available until the end of 1901, in case net earnings should prove insufficient to meet the dividends at any time prior to that date.

The details of the operating expenses show that only 50.2 per cent. of the total was absorbed by the cost of conducting transportation; maintenance of way and structure expenses were 28.3 per cent., and about $725 per mile of road operated. Maintenance of equipment was 15½ per cent., the two maintenance accounts equaling 43.8 per cent. of the total expenses.

President Mellen, in reviewing the year's business, points out that in many particulars the year has been exceptional. The weather last winter was favorable and materially aided in producing the excellent net results shown, and was in marked contrast to the record of the previous winter. But, of course, the economical results shown are attributable chiefly to grade reductions and to heavier motive power. Extensive improvement work has now been carried on for a number of years, the policy so successfully followed out having begun, as General Manager Kendrick points out, about eight years ago. The necessities of the Northern Pacific in the way of improved equipment, lower grades, heavier rails and more permanent structures was fully appreciated and a comprehensive policy mapped out to be folowed as the finances permitted. The results are now beginning to appear in the heavier tonnage moved in larger trains, fewer in number, so that important savings have been made in train mileage. The policy has been to adjust grades to make it practicable to haul trains of practically uniform and maximum weight over considerable sections of the road.

As may be expected, there has been in 1898 a very heavy increase in the train and car loads and consequent reduction in the ton mile cost. While the increase in ton mileage over last year, according to the General Manager's report, was 797,300,000; there was a decrease in freight train miles of 295,100. The average revenue train load has increased from 182 tons last year, to 264 tons, or 82 tons, equal to 45 per cent. The 1897 figures which are given are those for the ten months ending June 30 only, and for that reason the ton and train miles, etc., are not compared. The more important of these figures follow:

Passenger.		
Number passengers carried	1,583,632	....
Passengers, one mile	209,614,677	....
Average journey (miles)	132	95
Train mile earnings	$1.769	1.37
Train miles	3,295,279	....
Car miles	25,740,255	....
Number passengers per train	63.61	....
Number cars per train	7.81	7.07
Rate per passenger mile, cents	2.22	2.80
Freight.		
Tons revenue freight	4,951,183	....
Revenue ton miles	1,618,170,000	....
Average haul (miles)	327	295
Ton mile rate, cents	1.065	1.14
Train mile earnings	$2.85	$2.10
Train miles	6,115,784	....
Loaded freight car miles	132,529,879	....
Empty freight car miles	48,254,948	....
Number freight cars per train	29.6	24.8
Number loaded cars per train	21.7	18.2
Tons revenue freight per loaded car	12.2	10.1
Average revenue train load, tons	265	183
Total train load	313	230

The extensive improvements completed in 1898 can only be briefly summarized: 209 miles of 72-lb. rails were laid in the main track; 301 miles were ballasted, and 40 miles of siding and spur tracks have been built, while 215 miles of embankment have been widened to a 16-ft. standard, and during the year 9.7 miles of wooden bridges have been filled in or replaced with metal structures. The company has 83½ miles of bridge work on its lines, of which 93½ per cent. consists of wooden structures. Since 1885 63 miles of timber bridges have been replaced by embankments or steel structures.

Grade revisions are in progress on five divisions at a cost of $494,000, and all this work will be finished this season, which will also see its practical conclusion on the main line, except on parts of the Rocky Mountain and Idaho divisions, where the tonnage is not specially heavy.

The General Manager's report contains comparisons of train tonnage showing the engine rating upon the various divisions prior to 1893, and in 1897 and 1898, and the intended future rating. Mr. Kendrick states that the improvements are not wholly attributable to grade revision, a portion being due to the introduction of larger engines and the reassignment of old ones to those districts where they can be used most effectively. The comparison of standard train loads for certain of the districts and divisions which show the greatest changes are given below:

	Prior to 1893.	1897.	1898.	Future.
Lake Superior, 2d District	650	1,350	1,350	1,350
Minnesota, 2d	700	1,350	1,500	1,500
Missouri, 1st	425	675	925	1,350
Missouri, 2d	425	715	875	1,350
Yellowstone	625 E.B.	1,200 E.B.	1,250	1,500
	625 W.B.	850 W.B.	875	1,350
Montana, 2d.	E.B. 375	1,000	1,000 E.B.	1,200
	W.B. 750	1,000	1,000 W.B.	1,000
Idaho, 1st	450	1,000	1,065 E.B.	1,200
			W.B.	1,065
Idaho, 3d	E.B. 650	1,500	1,500	1,500
	W.B. 500	820	1,125	1,200
Pacific, 2d	525	620	1,100	1,100

With the completion of the grade revision the favorable grades will be east-bound on all divisions, except on one district of the Pacific.

The locomotive equipment of the company has been largely increased in tonnage hauling capacity, but the actual number of engines has been reduced from 582 to 542 within the year. The new locomotives purchased, however, numbering 43, with 12 others taken over with the Montana Union road, have been of such increased weight that the present motive power has a total increased weight of 898,000 lbs, or 1.6 per cent. more than the equipment in service a year ago, while its total horse-power capacity is 5.8 per cent. greater, as shown by comparison of indicator cards taken under service conditions. The increased capacity is further demonstrated by monthly returns for the last six months of 1897 and 1898, showing the ton miles hauled by engines. The per cent. of increase in the gross tons per engine mile varies from 9 per cent. to 23.9 per cent., and the tons per train mile from 11 per cent. to 20.9 per cent. During the year, 95 of the least serviceable of the 225 light 17 x 24 eight-wheel engines have been retired. As a matter of fact, 43 engines replace the 95 light ones. The company now runs its engines through over entire divisions, instead of stopping at district terminals. This change has resulted in reducing the number of passenger engines in main-line service about one-half, and saving considerable labor and expense at district terminals. It has also made it possible to discontinue the operation of some of the smaller district terminals. All of the new freight engines are compounds, and one-half of the passenger engines.

In the last three years, 5,586 freight cars have been reinforced, increasing their capacity from 40,000 lbs. to 50,000 lbs. each, and altogether representing an increased capacity equivalent to 930 cars of 60,000 lbs. each.

Illinois Central.—The operations detailed in the annual report for the year ending June 30 cover a considerably increased mileage over that reported in the previous year. On June 30, 1897, the miles operated were 3,130; they are now 3,808, exclusive of the 807 miles of the controlled Yazoo & Mississippi Valley road in both years. The increase in average operated mileage was 645 miles, or 20.6 per cent., while the absolute increase in miles owned is 678; of this the Louisville division accounts for all but a small share, as it includes the former Chesapeake, Ohio & Southwestern, 440 miles, and the Ohio Valley, 139 miles. The only other important addition during the year was the Chicago & Texas, 75 miles. The control of this was secured to maintain the connection with the St. Louis Southwestern, which had changed its Mississippi River terminus from opposite Cairo to Gray's Point, Mo.

With this increase in mileage the comparisons with last year are not to be judged so much by the operating revenue as by the net figures of the income account. These show the year's operations to have been very profitable. The net income available for interest increased in the large sum of $2,363,012, or 25 per cent. over 1897, while fixed charges and rentals were only $749,366, or 13 per cent. higher; this left $1,613,655, or 43.6 per cent., more available for dividends. The actual sum earned in the year for the stock was $4,388,655, and the 5 per cent. dividends paid called for only $2,625,000, leaving a surplus on the year's operations of $1,763,655 against only $153,553 in 1897. As will

be seen by the summary of the income account given below, all but about $37,000 of this was appropriated for improvements, etc., instead of for the increased dividends which Wall Street at one time was confidently expecting.

The revenue of the last two years is summarized in the following table:

	1898.	1897.	Inc.
Aver. miles operated	3,775	3,130	645
Gross receipts	$27,317,820	$22,110,938	$5,206,882
Oper. expenses and taxes	18,655,470	15,735,884	2,919,586
Net income	$8,662,350	$6,375,054	$2,287,296
Per cent. exp. to earn	68.3	71.2	....
Land receipts	$59,305	$53,440	$5,865
Interest, receipts, etc	2,177,064	2,110,756	66,308
Total income	$10,898,719	$8,539,250	$2,359,469
Interest and rentals	6,510,064	5,760,697	749,367
Balance	$4,388,655	$2,778,553	$1,610,102
Dividends	2,625,000	2,625,000	.....
Insurance fund	501,452	.....	501,452
Betterments	829,000	150,000	679,000
Air brakes and couplers	396,000	.....	396,000
Surplus	$37,203	$3,553	$33,650

Of the more than 5½ millions gained in gross earnings, 3,756,711 was furnished by freight traffic, which gave 69.3 per cent. of the total receipts, while passenger earnings, which were 18.7 per cent. of the total, gained $889,400, or 21 per cent., over last year's business.

The tonnage moved was 12,694,000, or 27.6 per cent. more than last year, with an increase of 20½ per cent. in ton miles. Comparisons of these and other similar figures are affected, of course, by the increase in mileage, and, therefore, need not be stated in detail. The average freight haul fell off during the year from 227 to 214 miles, but the ton-mile rate rose to 6.95 mills from 6.71 mills. As a result, freight train mile earnings are $1.33 against $1.30. The passenger mile rate fell off slightly, but the average journey increased, as well as the average number of passengers per train, and the train mile earnings were also better. Such of the traffic figures as are comparable are given below:

	1898.	1897.
Average freight haul (miles)	214	227
Ton-mile rate (mills)	6.95	6.71
Freight train mile earnings	$1.33	$1.30
Average passenger journey (miles)	19.31	16.6
Passenger mile rate (cents)	1.938	1.979
Pass. train mile earnings (cents)	77.8	77.4
Average train load (tons)	191	194
Tons per loaded car	12.69	12.51
Loaded cars per freight train	15.06	15.47
Empty cars per freight train	6.43	7.01

Of the increase in expenses, excluding taxes ($2,679,113, or 18¼ per cent.), maintenance of way cost $661,200 (18 per cent.) more than last year, and equipment maintenance was $419,700, or 15.5 per cent. more. The maintenance work of the year has been very extensive; rail renewals called for 31,325 tons of new rails, costing $290,869, against 30,155 tons laid last year at a cost of $492,185. The expenses for maintenance of way per mile were $1,118 in 1898, $1,148 in 1897, $1,036 in 1896, and $879 in 1895. A rail section of 85 lbs. has been adopted as the standard weight, in place of 70 and 75 lb. rails, and all rail renewals have been made with the new section except at the approaches of the Cairo bridge, where four miles of 110-lb. rails have been laid. In wooden bridge repairs the standard floor has been strengthened.

The equipment was considerably increased by cars and engines taken with acquired lines, but excluding this the changes in the year have included the purchase of 18 new engines, leaving nine to be built to complete the inventory; these were delivered after July 1, and their cost has been provided for out of charges to repairs and renewal funds. The freight cars condemned in 1898 number 610, of which 398 were replaced by the end of the year, and the balance are building at the company's shops.

The charges to capital during the year were $2,833,340, of which, however, $1,249,000 was provided out of income or special funds, leaving the net charge $1,583,636. The largest items were $202,419 for reduction of grades between East Cairo, Ky., and Memphis, Tenn.; $138,400 for new sidings, $374,200 for buildings and station grounds, and $215,656 for new second track. With the 17 miles of second track built last year, the total is 226 miles, and the 37 miles of sidings built brought the total up to 1,023 miles. The grade revision completed between East Cairo and Fulton, Ky., is being followed with the more serious work of reducing the southbound grades between Fulton and Memphis, from the present maximum of 60 ft., to one of 26.4 ft. to the mile, which practically conforms to the ruling grades across the prairies of Illinois, between Chicago and Carbondale. This work can not be completed until toward the close of the calendar year 1899, and is estimated to cost approximately $1,200,000.

In about 18 months the connection of the Yazoo & Mississippi Valley with what was formerly known as the Yazoo Branch will afford a line Chicago to New Orleans, via Memphis, approximately 942 miles long, having nowhere, except between Carbondale and Fulton, grades exceeding 26.4 ft. to the mile against southbound traffic. The use, on these 99 miles between Carbondale and Fulton, of heavy locomotives will readily overcome the grades of 38 ft. to the mile there prevailing.

The revenue of the St. Louis division, formerly the St. Louis, Alton & Terre Haute, and the Louisville division, are stated separately. The figures given show that both divisions were a direct source of profit. The former earned $548,139, and had to meet net fixed charges of $502,399, leaving a surplus of $45,740. The Louisville division net earnings were $687,517, and the fixed charges, less interest on bonds held by the Illinois Central, were $501,885, leaving a balance of $185,632.

Oregon Railroad & Navigation Company.—In the annual report of this company we have the details of a prosperous year by another of the successful and dividend-paying reorganized properties. Besides its rail lines of 1,065 miles, the company operates river and ocean steamers on routes aggregating 1,987 miles. The result of the year's business on the rail lines was an increase in freight earnings of $1,515,900, or 48.7 per cent., and in total gross earnings of $1,862,000, or 45 per cent. With an increase in expenses of $932,500, this left net earnings above the 1897 total by about the same amount as expenses, $930,000. The water lines also showed improvement in revenue, and the surplus for the year, after paying 5 per cent. dividends on the preferred stock and 2 per cent. on the common, was $963,855. The comparative revenue statement follows:

	1898.	1897.	Increase.
Earnings, rail lines	$5,992,471	$4,130,380	$1,862,091
Earnings, water lines	902,922	547,545	355,377
Total earnings	$6,895,393	$4,677,925	$2,217,468
Expenses, rail lines	3,186,878	2,245,694	941,184
Expenses, water lines	766,542	533,354	233,188
Total operating expenses	$3,953,420	$2,779,048	$1,174,372
Net earnings	2,941,973	1,898,877	1,043,096
Miscellaneous income	77,866	50,580	27,285
Total income	$3,019,839	$1,949,457	$1,070,382
The charges against income were:			
Bond interest	$865,492	$897,640	*$32,148
Sinking fund	151,230	136,650	17,580
Taxes	156,296	163,696	*7,400
Betterments	.....	42,347	*42,347
Depreciation, water lines	89,350	35,667	53,683
Miscellaneous	616	.....	616
Preferred dividends	550,000	110,000	440,000
Common stock dividends	240,000	.....	240,000
Surplus	$963,855	$563,457	$400,398

*Decrease.

The per cent. of expenses on the rail lines was 53.18 per cent., and on the water lines 84.9 per cent. The amount available for dividends, after deducting all charges, etc., was $1,753,855. The dividends declared in the year, $790,000, included an extra 1 per cent. on the preferred, a provision in the charter requiring the payment of 4 per cent. on the preferred in any calendar year before any dividend could be paid on the common.

Expenses included a large amount of extraordinary improvements; $565,028 was so spent, of which $102,429 was for changes of line on about 10 miles of road at different points, resulting in the elimination of 1,087 degrees of curvature. Other important expenditures included were $171,782 for relaying 111 miles, nearly 10½ per cent. of the mileage, chiefly with 75-lb. rails; $71,580 was for widening embankments, $73,466 for renewing and filling in bridges, and $85,939 for equipment improvements, including five new engines; from all of which it is evident that betterment work was carried on throughout the year on an extensive scale. The expenses of maintenance of way in fact nearly doubled, this account and that of equipment maintenance being nearly as large as the cost of transportation on the rail lines, a quite unusual proportion. Their proportion of the expenses was over 45 per cent. Maintenance of way expenses alone were about $972 per mile of road.

The tonnage carried on the rail lines was 1,316,500 tons, against 862,400 in 1897, and of the increase of 454,100 tons shown grain gave 258,100 tons, that tonnage being 40 per cent. of the total. These are larger figures than ever before reported, and in fact all the revenue and traffic statistics show the highest totals yet reached, the only exception being passenger receipts, which were slightly higher in 1892 and 1893 than in 1898. The traffic statistics of the rail lines for the last three years are given below:

	1898.	1897.	1896.
Total tonnage	1,316,520	862,400	736,886
Ton miles	308,503,100	189,836,500	164,959,000
Ton mile rate	c 1.50	c 1.64	c 1.68
Average freight haul	234	220	224
Freight earnings per mile	$1,367	$2,935	$2,616
Passenger earn. per mile	$1,026	$716	$680
Passengers carried	377,319	249,375	246,103
Passenger miles	37,852,480	24,788,843	23,400,534
Passenger mile rate	c 2.87	c 3.06	c 3.08

Both local and through tonnage have gained largely. The average haul on local freight increased from 180 to 207 miles.

Some of the train statistics are given below:

	1898.	1897.
Passenger train miles	797,445	634,356
Freight train miles	1,093,626	817,028
Total revenue train miles	2,052,880	1,642,136
Number loaded cars per freight train	18.4	15.9
Average train load, tons	246	188

The increase in freight train miles is equal to 25 per cent., while the gain in ton miles was 118,667,000, or about 62 per cent., as compared with 1897.

The chief financial transaction of the year was the arrangement to refund the $4,451,000 of outstanding 6 per cent. bonds with a like amount of consolidated 4 per cent. bonds, and the larger proportion of the issue had been retired on June 30. The premium paid on the maturing bonds and the discount on the fours issued in exchange was charged against profit and loss.

St. Louis & San Francisco.—We have received advance sheets of the annual report for the fiscal year ending June 30, 1898. Needless to say, the year was one of considerable prosperity for the company. Relatively speaking, it gained about as much in gross revenue as the Atchison, by which it was for some time operated before the receivership. Perhaps it may be said by some that it was even more prosperous because it paid four per cent. dividends on its first preferred stock, and one per cent. on the second preferred. In the matter of prompt beginning of dividends, the company may be said to have made a record among the already considerable number of recently organized properties which have been able to distribute some return on their stocks. It was reorganized in June, 1896, and within a year had begun paying first preferred dividends, followed in July last with a start in second preferred dividends.

The business of last year resulted in a gain of 14.9 per cent. in gross traffic revenue, with an increase of 15.6 per cent. in expenses, leaving net earnings 13.1 per cent. higher than last year. The surplus available for dividends more than doubled. The principal figures of the income account for 1898 and 1897 follow:

	1898.	1897.	Inc.
Miles operated	1,282	1,162	120
Gross earnings	$6,886,468	$5,993,336	$893,132
Operating expenses	4,030,109	3,483,628	546,481
Net earnings	$2,856,359	$2,509,708	$346,651
Other receipts	69,760	7,066	62,694
Total net income	$2,926,119	$2,516 774	$409,345
Bond interest	2,037,997	1,994,524	43,473
Taxes	188,404	171,257	17,147
Total charges	2,239,673	2,185,707	53,966
Surplus	$686,446	$331,067	$355,379
Dividends,* etc.	360,000	100,000	260,000
Balance to profit and loss	$326,446	$231,067	$95,379

*In 1898, 4 per cent. on first preferred and 2 per cent. on second preferred; in 1897, 2 per cent. on first preferred.

The traffic statistics show a gain in ton miles and in tonnage of 20 per cent. The train load increased 11 tons to 128 tons. The company was also able to get a better freight car load, and to reduce the empty car miles run so that though the ton-mile rate fell off, both the train and car mile earnings are higher than in 1897. This is also true of passenger statistics. The train and car mile expenses also increased, but not enough to prevent a better net profit in both items. The chief train and traffic statistics follow:

	1898.	1897.	Inc.
Freight.			
Tons carried	2,526,002	2,098,829	427,173
Tons, one mile	485,592,477	403,009,043	82,583,434
Train miles	3,796,931	3,434,968	361,963
Loaded car miles	44,633,841	39,486,437	5,147,404
Empty car miles	20,542,667	21,517,802	†975,135
Average train load	128	117	11
Aver. number loaded cars per train	11.75	11.49	.26
Aver. number empty cars per train	5.41	6.26	†.85
Ton mile rate	c 1.055	c 1.111	†.056
Average freight haul	192	192	....
Train mile earnings	$1.35	$1.30	$.05
Passenger.			
Passengers carried	1,367,318	990,591	356,727
Passenger miles	57,049,764	43,468,524	13,581,240
Passenger mile rate, cents	2.188	2.362	†.174
Train miles	1,863,580	1,668,181	195,399
Average number passengers per car	8.8	7.9	.9
Average number passengers per train	30.6	26.1	4.5
Average car mile earnings	c 19.3	18.6	.7
Train mile receipts	c 90.5	86.5	4.0

†Decrease.

The company has expended during the year all of the new equipment and improvement fund of $501,503, available on June 30, 1897. Of this $294,725 was on equipment account including 400 new freight cars, costing $214,143 and $74,003 for equipping cars with air brakes and couplers. The largest item in maintenance improvements was $109,427 for new ballast.

When a Government sets out to regulate an important undertaking—public, semi-public or other—for which private parties are primarily responsible, it is likely to find itself with a good many delicate questions on its hands. This is illustrated by a report in the last railroad accident return issued by the British Board of Trade. In October last, Lieut. Col. Yorke, one of the Inspectors of the Board, being detailed to inspect a new railroad, the Vale of Glamorgan line, in Ireland, accepted as safe for travel a masonry viaduct at Porthkerry of 16 arches, the highest being over 100 ft. high, and 50 ft. clear span, the whole bridge being nearly 900 ft. long. But he had to impose rigid restrictions on the running of trains over the viaduct, on account of suspected weaknesses in the foundations, and he is now able to congratulate himself on having done just the right thing; for in January one of the piers sank about 16 in., and leaned so that the arches were badly cracked. Traffic had to be suspended and the company proceeded to build a track around the valley which the viaduct crosses. The ground was treacherous in several places at and near the bridge, but the railroad company was urgent to begin business, and so Col. Yorke, after some hesitation, authorized the running of passenger trains for three months on condition that a watchman be kept at the bridge night and day, and that the speed of trains be lim-

ited to 20 miles an hour. The report now presented by Col. Yorke shows that his conditional approval of the viaduct (in November) was based, among other things, on the statement of the engineer of the bridge, that every pier rested on not less than 30 ft. of solid rock, this statement being accompanied by drawings and being said to be based on careful borings made by competent men. But on making more particular inquiry after the failure it appeared that about 22 ft. of yellow and blue clay, shale and other soft material lay between the bottom of that pier and the solid foundation. At the original inspection, when the drawings were given to Col. Yorke, it was understood that the borings on which the engineer's drawings were based had been made by the contractor, but it now appears that they were made by third parties, Messrs. Tilley & Sons, artesian well sinkers. Messrs. Tilley make a statement of what they found at each pier, and the November drawing is exposed as false.

The Brockton Street Railway Company, of Brockton, Mass., has required all of its conductors and motormen to give bonds of $300 each, to save the company from loss by dishonest acts, negligence or misconduct, and the premium which the motormen have to pay is nearly twice as large as that demanded of the conductors. The insurance company, the Fidelity and Deposit Company, of Maryland, asks $2.75 a year from motormen and $1.50 a year from conductors; from which it would appear that the probable loss from "knocking down" fares is not so large as that to be expected from collisions and damages to cars, wagons and pedestrians. The 147 employes required to furnish these bonds were considerably stirred up about the matter at first, and they threatened to strike; and, in fact, 25 of them did persist in their refusal to give the bond, and, it appears, gave up their jobs. The principal feature of the bond which aroused the objections of the men was a clause authorizing the Fidelity Company to accept the sworn statement of any officer of the railroad company as conclusive evidence of dishonest acts or defaults. After the men had consulted a lawyer and had appealed to the City Council this clause was withdrawn, and, as before stated, five-sixths of the men then agreed to the company's terms, though still protesting that the requirement of a bond was unreasonable. A similar difficulty is this week reported from Haverhill, Mass., where three-fourths of the men on one division of the Lowell, Lawrence & Haverhill road left their places rather than give bonds.

The Florida East Coast Railway now sells tickets for one, three, six, nine and 12 months, good for unlimited travel anywhere on the company's lines. The ticket is, of course, non-transferable and the prices are: One month, $50; three months, $100; six months, $175; one year, $350. The main line of this road is from Jacksonville, Fla., southward to Miami, 366 miles. Most of the line is through a very thinly populated country, and from New Smyrna to Miami, 241 miles, there is only one passenger train a day each way. There are three branches, one of them 27 miles long; and the total length of line operated is 411 miles. The ticket consists of three pages, each 3 in. x 5½ in., all pasted upon a leather cover and folded together. To one page is pasted the photograph of the purchaser, and a part of the selling agent's date-stamp impression covers the lower part of the photograph. Besides the photograph the holder is briefly described in writing, the six items noted being residence, age, weight, height, color of eyes and color of hair. No part of the ticket is redeemable, except on account of the death of the passenger.

TECHNICAL.

Manufacturing and Business.

Mr. R. M. Shankland has opened an office at No. 913 "The Rookery," Chicago, as a consulting engineer, and will make a specialty of foundations and steel work for office buildings, warehouses and factories. Mr. Shankland graduated, with the degree of M. E., from the University of Michigan in 1888, and has since been connected for short periods with the Wrought Iron Bridge Co., Canton, O., and the Chief Engineer's office of the Pittsburgh, Cincinnati, Chicago & St. Louis Railway; since 1890 he has been associated with D. H. Burnham & Co., architects, and has superintended the erection of a number of large buildings. Mr. Shankland is a member of the American Society of Mechanical Engineers, American Society of Civil Engineers and the Western Society of Engineers.

One of the most substantial government buildings in the country is the new post office building in Washington, D. C. Its hydraulic equipment throughout is of the most modern type, and the Supervising Architect's office has adopted the high duty pumping engines, made by the Laidlaw-Dunn-Gordon Co. of Cincinnati, for the elevator service. Two of these have been ordered, making 11 pumps in all put into the building by this Cincinnati concern.

New Stations and Shops.

We are officially informed that the question of a new pasenger station at Decatur, Ill., to be used jointly by the Illinois Central and the Wabash, has been under consideration by the managements of the two railroads for some time. The intention is to build a new station next year, but nothing has been decided as to plans and details.

The Peavy Grain Co., of Chicago, has let a contract to Barnett & Record of Chicago for an addition to its elevators at South Chicago. The new building will connect elevator "B" to the slip, and will have a capacity of about 1,000,000 bushels. It will be completed about Dec. 1.

The Intercolonial Railway is asking for tenders for a half million bushel elevator to be built at Halifax.

Work will be started at once on new shops for the Canadian Pacific at Calgary. The buildings will include a 12-stall roundhouse, machine shop, car repairing shop, blacksmith shop, storehouse, coal tanks, ash pit and turntable.

It is stated that the Lehigh Valley has asked for bids for building three new car buildings at Sayre, Pa.

The Baltimore & Ohio will build a new fruit and vegetable warehouse and auction room in Pittsburgh, near the freight station, between the river and Freight avenue. The depot will be 35 ft. wide and 350 ft. long. Fifty feet will be used for offices and the auction room, which will be finished in amphitheatre style, with rows of seats one above the other and a pit for the auctioneers. The building will have an iron frame, covered with corrugated iron and fitted throughout with Wilson patent rolling shutters for both doors and windows. The ventilation will be good for summer storage and in winter steam heat will prevent freezing. There will be two tracks on one side of the building, and a 35-ft. brick-paved street on the other. Immediately adjoining will be a bulk track from which cars can be unloaded.

Work has been begun on the new passenger station of the Boston & Albany at Huntington avenue (Back Bay), Boston.

The St. Louis, Keokuk & Northwestern has awarded a contract to L. F. Griffey for building a new freight depot and office building at Keokuk.

The St. Louis Southwestern shops at Pine Bluff, Ark., were damaged by fire Sept. 13. It is stated that the loss will be about $35,000.

Concentration of Switch Levers on a Street Railroad.

On the street (surface) railroad line of the Boston Elevated Co. at Haymarket Square, Boston, where the tracks to and from the North Union Station connect with those running through the subway, the switches are now worked by levers fixed in a frame in a tower, connection being made by rods. Most of the day cars follow one another over these switches at intervals of about seven seconds. Two men are on duty in the tower. The arrangement has economized labor as well as made the movement of the cars through the junction safer and less liable to detention.

M. C. B. Brake Rack to Be Moved to Purdue.

The removal of the M. C. B. brake rack from Altoona, Pa., to the Mechanical Laboratory of Purdue University, Lafayette, Ind., has now been arranged for, and the change will be made this fall. This will enable the M. C. B. Committee on Triple Valve Tests to conduct at Purdue the competitive trials of triples, which were arranged for by the last Convention, under more favorable conditions than were possible at Altoona. It also places in charge of Prof. Goss another piece of useful apparatus, which can be used for such experimental work as he may decide to carry out.

New Battleships.

The three new battleships, the Maine, the Ohio and the Missouri, will be built by William Cramp & Sons' Ship & Engine Building Co., the Union Iron Works and the Newport News Ship Building Co., respectively. The ships will be of 12,500 tons displacement, with a coaling capacity of 2,000 tons, and a speed of 18½ knots.

The G. E. Enclosed Arc Lamps.

This miniature arc lamp designed for 110 volt direct current circuits, is frequently required to be used at slightly higher or lower voltages. An adjustable resistance has, therefore, been provided in the top of the casing, which adapts the lamp to any line voltage from 100 to 120. The standard current required by the G. E. miniature arc lamp is 2½ amperes, but a loop in the magnet coil permits an adjustment for 3 amperes. Seventy-three to 75 volts are required at the arc and when adjusted for 2½ amperes with a line voltage of 110, the energy at the terminals is 275 watts. Adjusted for 3 amperes the energy is 330 watts. The life is from 40 to 45 hours, with standard current, and from 35 to 40 hours with 3 amperes.

The mechanism of the miniature arc lamp works on the General Electric carbon feed principle. The carbon is fed through a brass tube extending through the center of the magnet coil. The double cam clutch which works directly upon the carbon is simple in its action and has few parts. Special attention has been given to the design of the carbon holders and the general arrangement of the frame to facilitate rapid trimming.

No outer globe is used. Each lamp is arranged with a switch so that it can be readily thrown in or out of circuit. Several hundred of these lamps have been introduced among central stations in the past 60 days, and there seems to be an increasing demand for arc lamps of small and attractive design.

Chicago Public Works.

Arrangements have been made for continuing work on the new intercepting sewer system during the winter months. Sheds will be built over the shafts and around the machinery as a protection from the weather.

On Sept. 12 City Engineer Ericson made a report to Mr. L. E. McGann, Commissioner of Public Works, which is supplementary to the report of Dec. 3, 1897, and again calls attention to the condition of the engines and boilers of the Chicago Avenue Pumping Station, which supplies water to almost one-half of the city. The report says that the four engines, having a rated capacity of 75,000,000 gallons a day, have been in service from 26 to 45 years, and that from repeated repairing and deterioration are unreliable; that large expeditures are necessary to keep them in service, and thousands of dollars are wasted in fuel to run them. The four boilers have been in service 27 years, and may give out at any time, money spent in repairing them being practically wasted. The two 12,000,000-gal. Gaskill pumping engines have been in use 11 years, and need a thorough overhauling; the six boilers which furnish steam for the pumping engines have also been in use 11 years, and need re-tubing and extensive repairs. The report recommends that the old engines and boilers be replaced at once with modern types, as the consequences of delay will be serious. It is estimated that the necessary changes will cost $328,388, and that the work could be completed by next summer. The proposition is to move the station east, on land not now improved, and to sell the present site, which would realize money enough for the necessary changes. As soon as a plan is approved by the Mayor, the Council will be asked to give authority for the work.

Large Interlocking Contracts.

The National Switch & Signal Company has just closed a contract to put in a large interlocking plant at Carlton, Minn., for the Great Northern. This plant will consist of 52 levers. This company has also received an order from the Harlem Line (the New York Central and the New York, New Haven & Hartford) to rebuild the interlocking machine at 46th street, Grand Central Station, New York, and enlarge the machine to 172 levers. This machine will control all switches leading to this station, and, as the terminal is stub end, the necessities of operation require very complicated movements, which makes the installation of this plant one of unusual difficulty, especially as it is intended to put in the additional work for the new switches without interrupting traffic. Mr. F. S. Curtis, Supervisor of the Harlem Line, will do the outside work with his own force.

The National Company has also received an order from the Baltimore & Ohio for an interlocking plant at Plymouth, O., and has just completed a 60-lever machine for the Cleveland, Cincinnati, Chicago & St. Louis, at Greensburg, Ind., where is one of the most novel plants recently built. All the signal poles and foundations for pipe carriers, bell cranks, etc., are of iron, and the signal tower is supported on a high, iron skeleton frame.

The National is also installing a large plant at Bellefontaine, O., of 72 levers, and has a contract for a complex crossing of the Lake Erie & Western, the Wabash, the Chicago, Indianapolis & Louisville and the Cleveland, Cincinnati, Chicago & St. Louis, at Lafayette, Ind. As the grades of the several railroads are widely separated, the installation of this plant will be a difficult job.

The National is putting in some automatic electric semaphore signals for the Southern Pacific in California, and an interlocking plant in Mexico, the first in that country, together with 70 sets of station block signals.

The Cornwall Bridge Accident.

Mr. Charles Sooysmith writes to us concerning the fall of two spans of the New York & Ottawa Bridge over the St. Lawrence at Cornwall, "that owing to the great current and the débris at the site of the Cornwall accident, it has not yet been possible to examine the situation. The bottom was very hard, and we know that there was only the best of workmanship and materials in the pier, and feel absolutely certain that it did not fall because of flaws in these respects." Last week we suggested that it is very possible that the cause of this most unfortunate accident will never be definitely known; certainly it is a pretty hard matter to get at.

The Dangers from 100 Volts Alternating Current.

The researches of Professor Webers at Zurich have led some to doubt the belief that an alternating current of 100 volts potential was entirely harmless. From the physical effect of the current on himself, he concludes that grasping with both hands two wires carrying an alternating current of more than 100 volts is dangerous, even if the hands are dry. This opin-

ion is confirmed by the account in a recent number of the Electrotechnische Zeitschrift of four fatal accidents within 16 months, all occurring at the same plant. In the first three cases the pressure was only 115 volts. In the fourth, it may have been as great as 230 volts, but was probably only 115 volts.

Acetylene Gas for Lighting Railroad Cars.

Mr. P. W. Resseman, General Superintendent of the Pontiac Pacific Junction and the Ottawa & Gatineau Railroads, recently received an inquiry from Major Girouard, R. E., President of the State Railroads of Egypt, through Col. J. H. Western, Inspecting Engineer for Government Railroads of Egypt, regarding the use of acetylene gas to light the cars, as used by the two railroads of which Mr. Resseman is General Superintendent. It addition to what was given in our issue of March 18 last, p. 191, the following extracts from Mr. Resseman's reply may be of interest: In Canada, because of the severe frost in winter, the gas generators have to be placed inside the car to prevent freezing. The disadvantage of this lies in the fact that the slightest leak in the generator causes a disagreeable smell. The ordinary coaches in Canada on the Pontiac Pacific Junction and the Ottawa & Gatineau railroads are using the Holland system. The cars, which were previously lighted by 14 coal oil burners, can be well lighted with five 25-candle power burners consuming 1½ ft. per hour. The carbide supplies 5 cu. ft. of gas per pound, making the total cost of the lights two cents an hour for each car. The generators used cost $12, the carbide is sold at $4.50 for 100 lbs., and the cost of piping is about eight cents a foot. Pipes ⅜ in. in diameter are used for the main, and ¼ in. for connections. Side lights give the best results. The company is using ordinary gas fixtures, ¼-in. L cocks and porcelain globes with 5-in. rings.

THE SCRAP HEAP.

Notes.

The Erie Railroad has given orders to passenger conductors to see that soldiers on their trains who have no money are suitably fed in the dining car and, in general, are well taken care of. The Chicago & Northwestern has issued a similar order.

The Union Elevator at Toledo, O., was destroyed by an explosion and fire on Tuesday night last, and the press reports say that 10 men lost their lives. A little daughter of the foreman was burned to death.

A press dispatch of Sept. 19 says that the Commissioner of Internal Revenue intends to take action in the courts against railroads which issue rebate checks for passenger fares without placing upon them the two-cent revenue stamp required by law.

At Chicago last week some curiosity was aroused by a replevin suit of the Pullman Company against the Chicago Great Western and the Chicago, Indianapolis & Louisville for 13 sleeping and 15 tourist cars. It appears that the railroad companies proposed to take the cars on Southern excursion business, while the Pullman Company desired to use them in the Northwest. The bond accompanying the writ of replevin was for $250,000.

The Baltimore & Ohio is putting up two new telegraph wires between Baltimore and Pittsburgh, 340 miles; and, with a view to their possible use for telephonic communication, they are to be of copper and will be so arranged that they can be used as a metallic circuit. The company is also putting up a new wire between Columbus, O., and Cincinnati; and altogether is using 800 miles of copper wire, weighing 166 lbs. to the mile.

A press dispatch from San Francisco says that the State Railroad Commissioners of California are going to undertake a thorough investigation of the affairs of the Pullman Palace Car Company, with a view to seeing whether the rates charged by the company can be legally reduced. If the Commissioners make as shining a success of this as they did of their investigation of the Southern Pacific Company, they will do a remarkable public service. The Railroad Commissioners of Texas are sending to all the railroads blanks for returns, to be made under oath, of all cotton shipments for the past year, showing destination, rates, amount of charges received, etc.

Progress in Equipping Freight Cars with Brakes and Couplers.

The Interstate Commerce Commission has published the results of the first semi-annual reports made to it by the railroad companies under the order, issued last spring, extending the time allowed in which the railroad companies should equip their freight cars with automatic couplers and continuous train brakes, under the law of March 2, 1893. The present report is for the six months from Dec. 1, 1897, to June 1, 1898. The number of roads reporting is 290, which includes all but four of the roads which petitioned the Commission for an extension of time. These 290 roads owned, on June 1, 1,153,290 freight cars, an increase of 20,567 during the half year.

There are 119,614 freight cars reported equipped with automatic couplers, and 67,202 reported equipped with train brakes during the six months, which makes a total of 792,443, or 69 per cent. of the freight cars equipped with automatic couplers, and 510,636, or 44 per cent., equipped with train brakes up to June 1. Of 32,323 locomotives owned June 1, 29,102, or 90 per cent., are equipped with driving wheel brakes.

Work of the Board of Strategy.

A large force of men in the employ of the Central Railroad of New Jersey has been engaged since Saturday in building tracks in the yard of the Raritan Copper Works at Perth Amboy, N. J. The object is to prevent the Lehigh Valley road from building a spur into the works. The Central officials discovered that the Lehigh expected to lay its track Saturday night, crossing the tracks of the Raritan North Shore Railroad, a branch of the Central. Without crossing those tracks the Lehigh could not enter the yard. Since Saturday night four tracks have been built by the Central, all of them spurs from the Raritan North Shore. To make sure that the Lehigh cannot cross them at will, these tracks have been laid on different grades. One is two feet below the North Shore, and another is three feet above it. One of the others resembles a toboggan track, the grade rising three feet in fifty. Cars standing on it are tilted to so many angles that they look like a wreck. The Central officials say that they will combat with force any attempt on the part of the Lehigh Company to enter the Copper Works property.—New York Evening Post.

Chicago Post Office Improvements.

Postmaster Charles U. Gordon, of Chicago, spent most of last week in Washington, where he succeeded in securing from the Post Office and Treasury departments a number of changes in the facilities and equipment of the Chicago office. An annex to the temporary Post Office on the Lake Front to cost $20,000 will be built at once, and bids will be advertised for by the Treasury Department immediately. Contract for the annex will be let within 30 days, and it will be ready for use early in December. It is proposed to have the plans for the addition so drawn as to provide for a spur track for mail cars from the street railroad directly into the building. Eight mail cars are now in service on four street lines, and the plan is to extend the service and increase the number of cars until 20 are in use.

Coal for Brazil.

Minister Bryan sends from Petropolis translation of the advertisement for coal for the Brazilian Central Railroad: "By order of the directory, it is made public that on the 31st of October next, at 1 o'clock p. m., proposals will be received for 120,000 tons of first quality coal for the consumption of the railroad during the next year. The contractors bind themselves to furnish coal of the first quality, coming from the mines of Cardiff or from others which furnish an article of equal quality, which fulfills the required conditions, recently mined, three times screened, which does not give more than 4 per cent. of ash nor contain more than nine-tenths of 1 per cent. of sulphur, and has a calorific power not less than 8,100 calories per gram by Thompson's calorimeter, all of which will be verified by analyses and experiments made by the administration of the railroad, and by anyone it may designate. Coal which does not show the qualities specified will be rejected by the contractors and other coal of required quality substituted. Not more than 5 per cent. of a size smaller than 30 cubic inches will be accepted. The prices shall refer to the English ton of 1,015 kilograms, customs duties not included. Delivery must begin in the first two weeks of January, 1899, and end in December of the same year.

"There can also be sold from 1,000 to 2,000 tons of coal every month by our dealers to various large consumers in Rio, if proper quality be furnished. I have been told that most of the American coal heretofore shipped here could not be used in the factories or by the railroads without a change in the grates in common use."

Telephony Taught by Mail.

The International Correspondence School, Scranton, Pa., has issued a pamphlet describing its course of instruction in telephony, recently established. This department is under the management of Mr. Kempster B. Miller, a man of long experience in the Patent Office at Washington, and in the manufacture of electrical apparatus. The synopsis of subjects fills 10 pages, and the ground work laid out evidently provides for a very thorough course of instruction in the principles of acoustics, descriptions of apparatus of all kinds, management of exchanges and power stations, construction and operation of lines, etc. The pamphlet states that most of the independent telephone exchanges established during the last five years have succeeded, but that many have failed because it was impossible to get competent telephone men to plan, equip and operate them. There is still a dearth of good men in this line, so that it is expected that the new department of the school will find a large field waiting for it. Mr. Miller designs to give instruction which will be of value to electrical engineers, switchboard designers, employees in telephone factories, accountants, officers, superintendents and operators.

Purdue.

We noted some time ago that Prof. J. J. Flather had resigned as Professor of Machine Design at Purdue University to accept a similar position at the University of Minnesota. No successor to Prof. Flather has as yet been appointed, and for the present the class room subjects carried by Prof. Flather will be taken by members of the present corps, while the drawing-room work will be in charge of Mr. L. O. Danse, of Lehigh University, as Instructor.

An Example of 20th Century Statesmanship.

The ridiculous length to which legislation adverse to railways has been carried in this country is pretty well illustrated by the fact that in the State of Wisconsin a law exists requiring that all turntables shall, when not in use, be locked with a chain and padlock. This is considered necessary in order to prevent small boys from becoming injured while playing with them. There would be just as much equity in a law compelling farmers to put a chain and padlock on their mowing machines, stable doors and numerous other places where small boys are liable to become injured. If the small boy is to be protected against himself by process of law the proper place to begin would be with the bicycle. With this machine he not only smashes up himself, but also lays out many innocent pedestrians. No one thinks of entering any protest against these incorrigibles breaking their bones and those of their fellows at football, baseball, bicycling, or even against their going off and drowning themselves once in a while; but when they use the property of a railroad for injuring themselves the railroads must suffer.—Railway Review.

The Fatal Accident in the Giovi Tunnel.

A curious thing about the suffocation of seven trainmen in a tunnel near Genoa, Italy, last month (Railroad Gazette, Aug. 19) is the fact that the accident was occasioned, partially or wholly, by a strike of coal miners in Wales. The railroad company, being unable on account of the strike to obtain Welsh coal, which is its usual fuel, was using coal of an inferior quality, and this made the smoke in the tunnel worse than usual. The tunnel has, however, been always troubled with smoke, and after this accident it was the general expectation that the Government would prohibit traffic through it until it had been provided with artificial ventilation. The collision resulting from this runaway was even more disastrous than was at first reported. From accounts which we find in Italian papers, it appears that the grade of the track in the tunnel is no less than 150 ft. per mile. The freight train ascending this grade consisted of only 10 cars, but the pushing engine began to slip, and the excessive quantity of smoke evolved soon asphyxiated the engineman and fireman, as well as four trainmen, and the fireman of the engine at the head of the train. The four brakemen fell off the cars to the ground, and two of them were killed by the fall. The brakes were, of course, all off, and the train had run backward but a short distance before it gained a very high speed. The collision occurred close to the station of Ponte Decimo; 11 persons were killed, including seven trainmen, and 30 were injured; most of them seriously. Both trains were shattered into fragments.

Weeks' Train Order Tablet.

The Railway Manifolding Co., of 203 South Canal street, Chicago, is now offering to railroad companies Weeks' patent train order tablet, a device which is claimed to be much simpler and more convenient for telegraphic train orders than the ordinary tissue paper and carbon sheets. It is claimed also to be equally cheap, when convenience and diminution of waste are considered. Each tablet consists of the sheets necessary to copy one order. For an order of which five copies must be made, four sheets, each about 7 in. x 9 in., are folded over a piece of cardboard 4½ in. x 7 in., half of the order being thus written on the upper or front side of the cardboard, and the other half on the back side. Each sheet has carbon on its back, providing for the writing on the sheet next below it; and the operator's copy is on the cardboard, half on one side and half on the other. The sheets have the usual printed heading and blanks at the bottom for signatures, but the cardboard has no printing whatever. The cardboard, with the sheets folded over it, makes a stiff blank, convenient to handle; and each office is supplied with a box containing blanks folded for three copies, another with blanks folded for five copies, and so on. An operator receiving an order will, of course, leave the thin sheets folded on the cardboard until he has taken the signatures of the conductor and engineman, thus taking advantage of the stiffness of the cardboard to aid in keeping in convenient shape the orders which are on hand for delivery.

Westinghouse and Walker Consolidation.

On Saturday last it was authoritatively announced that the Walker Company had, by interchange of securities, become a part of the Westinghouse Electric & Mfg. Co., no details of the transaction, however, being given out. By this combination interests representing in round numbers $15,000,000 Westinghouse stock and $2,500,000 Walker stock will make one company. The consolidated company will have practically no opposition in this country, except that of the General Electric Company, and satisfactory agreements have for some time existed between the General Electric and the Westinghouse people, so that no money is spent on patent litigations between these companies. Both of the companies which have now combined have considerable work on hand.

LOCOMOTIVE BUILDING.

The Arkansas, Louisiana & Southern expects to buy one or two locomotives before the end of the year.

The Mobile & Birmingham has ordered one 10-wheel locomotive from the Baldwin Locomotive Works.

The new engines being built at the shops of the Canadian Pacific are being turned out at the rate of one a week.

One eight-wheel locomotive has been ordered by the J. F. Welch Lumber Co. from the Baldwin Locomotive Works.

The Florida Central & Peninsular has placed an order with the Cooke Locomotive & Machine Works for two engines.

The Atlantic & North Carolina has ordered one American type passenger locomotive from the Baldwin Locomotive Works.

An order from the Arkansas Midland for one eight-wheel locomotive has recently been placed with the Baldwin Locomotive Works.

The Atlantic, Valdosta & Western has ordered one 10-wheel locomotive from the Baldwin Locomotive Works, in addition to the three engines noted in our issue of Aug. 26.

The Atchison, Topeka & Santa Fe has prepared specifications and is about asking bids on 30 heavy consolidation locomotives similar to the five engines ordered from the Dickson Locomotive Works in 1897 and noted in our issue of Dec. 4.

The Baldwin Locomotive Works is building one four-wheel switching engine for the Newfoundland Iron Ore Co., and one four-wheel switching engine for the United States Government Gun Factory; also one switching engine for the Pioneer Mining & Mfg. Co.

The Fitchburg has received the two 10-wheel engines, one simple and one compound, which were ordered in June from the Baldwin Locomotive Works, as noted in our issue of June 10. The Baldwin Locomotive Works is now rebuilding three compound consolidation engines for this road.

Mr. Richard J. Hartman, of the City of Mexico, one of the owners of the Western Railroad of Mexico, was at the Auditorium Hotel, Chicago, last week, and will be in this country for some time. It is announced that Mr. Hartman will place an order for two locomotives within 60 days for delivery in 90 days, and that 10 more will be ordered for his road within the year.

The Chicago, Burlington & Quincy is building, at its Aurora shops, two Richmond compound mogul locomotives, the cylinders and attachments being supplied by the Richmond Locomotive & Machine

Works. The same road is also building two mogul engines at West Burlington, and is preparing plans for two switching engines to be built at Aurora for use in Chicago.

The Hall's Bay has placed an order with the Baldwin Locomotive Works for four Class 10-26-D engines of 3 ft. 6 in. gage. They will weigh, in working order, about 80,500 lbs., with 64,000 on the driving wheels; burn soft coal and have 16 in. x 20 in. cylinders; 44 in. driving wheels; boilers, 54 in. in diam.; firebox, 78¾ in. long and 30¼ in. wide; and 220 tubes, 1¾ in. in diam. and 11 ft. long. The tank capacity will be 2,000 gals. of water.

The Santa Fe, Prescott & Phoenix has placed an order with the Brooks Locomotive Works for three new 10-wheel engines to be delivered the latter part of next month. They are to be built on the same general lines of the Brooks locomotives now in use on the road, which, we are informed by an officer of the road, have proved very satisfactory in every respect. The specifications for these engines are as follows: Cylinders, 19 in. x 24 in.; driving wheels, 56 in. diam.; fuel, bituminous coal; weight of engine, in working order, 123,000 lbs.; weight on driving wheels, about 100,000 lbs. The engines are to be equipped with steel cabs, Pyle-National electric headlights, Leeds reversible pilot couplers and Curtiss tender couplers.

The Southern has given an order to the Richmond Locomotive Works for one 10-wheel passenger engine, and to the Baldwin Locomotive Works for two of the same kind. They will weigh 154,000 lbs. each, with 118,000 lbs. on the driving wheels, having 21 in. x 28 in. cylinders, and 72 in. driving wheels. The boilers will be of the wagon top radial stay type; working steam pressure, 200 lbs.; fireboxes, 120 in. long and 41⅞ in. wide; tank capacity for water, 4,500 gals.; coal capacity, seven to eight tons. The engines will have Westinghouse driver and tender brakes, steel axles, Sterlingworth reinforced brakebeams, Ross-Mehan brake shoes on driving wheels and cast iron brake shoes on tenders; Janney couplers, Pyle-National electric headlights, Monitor No. 11 injectors, U. S. Metallic piston and valve rod packings, Coale muffler safety valves, Leach double sanding devices, Nathan No. 8 lubricators, Crosby thermostatic steam gages and Richardson balanced slide valves.

CAR BUILDING.

The Fitchburg has ordered 200 box cars from the Union Car Co.

The Norfolk & Ocean View will probably buy two passenger cars, 40 ft. long, for Winter service.

The Maine Central has given an order for 50 box cars to the Laconia Car Co., and the order will likely be increased to 150.

The Baltimore & Ohio has placed an order with Pullman's Palace Car Co. for three combination buffet and smoking cars.

The Atlantic Coast Line has placed an order for two coaches and three combination cars with Pullman's Palace Car Co.

The Florida East Coast has ordered eight sleeping cars, four from Jackson & Sharp and four from the Barney & Smith Car Co.

The Missouri, Kansas & Texas has prepared plans for a hospital car, but they have not yet been approved by the proper officials.

The White River, Lonoke & Western, a railroad now being built, will buy two flat cars and one combination coach and baggage car.

The order for the 400 coal cars and 150 flat cars for the Chicago & Northwestern, mentioned in our issue of last week, has been placed with the Haskell & Barker Car Co.

It is probable that the order for 250 refrigerator cars, given by the Continental Fruit Express to the Wells & French Co., and referred to in our issue of Sept. 9, will be increased to 500.

The Northern Pacific has increased its order for box cars by 600, 300 of which have been ordered from the Michigan-Peninsular Car Co., and 300 with the Illinois Car & Equipment Co. These cars are to be like the 1,000 ordered recently, and noted in our issues of July 15 and 29.

The Columbus, Hocking Valley & Toledo is about placing orders for 200 coal cars and 100 flat cars, if, indeed, the orders are not already given as we go to press. The order for flat cars will probably be given to a car building company in the South. It is understood more cars will be ordered by the road in the near future.

The Intercolonial is asking bids for building six second-class sleeping cars, four baggage cars and three combination postal and baggage cars. As far as we can learn, these second-class sleeping cars will have been the first of their kind built for the Intercolonial. The Wagner Palace Car Co. is building four solid vestibuled trains (28 cars), for this road, to be finished by Jan. 1.

The report published in our last issue to the effect that the Kansas City, Pittsburgh & Gulf had placed an order with the Barney & Smith Car Co. for 550 cars is authentic. The contract calls for 400 coal and 150 flat cars of 70,000 lbs. capacity, to be equipped with Cloud steel trucks, Bettendorf I-beam body transoms, Westinghouse air brakes and Tower couplers. The cars are for November delivery.

Pullman's Palace Car Co. is building five new postal cars, without platforms, for the Baltimore & Ohio. They will be 50 ft. long, 9 ft. 1 in. wide and 6 ft. 10 in. high at sides, and 9 ft. 2⅛ in. high at center. They will weigh 76,000 lbs. each, and have steel axles, National hollow brakebeams, Westinghouse brakes, Buckeye couplers, Safety Car Heating & Lighting Co.'s heating apparatus, Pintsch light, Pullman vestibules and steel tired wheels.

The Richmond Traction Co. will place an order for two closed cars within 30 days.

BRIDGE BUILDING.

ALLENTOWN, PA.—The Grand Jury has reported a county bridge necessary over Perklomen Creek, in Upper Milford township. Henry W. Fusselman, Clerk, Lehigh County.

COHOES, N. Y.—The Common Council of Cohoes has petitioned the State Railroad Commissioners that a change be made in the crossing at Ontario St. and the highway carried over the railroad tracks.

COSHOCTON, O.—The Commissioners of Coshocton County will build a bridge across Walhonding River in Bethlehem township.

EASTON, PA.—Concerning the bridge proposed over the Lehigh Coal & Navigation Co.'s canal at Freemansburg, the viewers report that the bridge is necessary, and that the town of Freemansburg should contribute a proportionate share of the cost. This has not been done, however, and so the bridge will not be built this year.

Viewers have been appointed to report on the petition for a bridge at South Bethlehem, to be built over the tracks of the North Pennsylvania and over the Lehigh Coal & Navigation Co.'s canal. H. F. Trumbower, Clerk; Jacob H. Delfies, Surveyor, Northampton County.

EAU CLAIRE, WIS.—Bids are wanted Sept. 28 for building a bridge to have four steel spans, each 144 ft. long. C. A. Alderman, City Engineer.

HAZLEHURST, MISS.—The Supervisors of Copiah County have voted to build two iron bridges over Pearl River, at Rockport and at Georgetown.

JOHNSTOWN, N. Y.—The Board of Aldermen of Johnstown will probably petition the State Railroad Commissioners to have a viaduct built on West Main St. over the F., J. & G. RR. tracks. John E. Burdick, Mayor.

MOUNT HOLLY SPRINGS, PA.—The Town Council has decided to build an iron bridge on the main street of the town.

OMAHA, NEB.—City Engineer Rosewater is preparing plans for the new Sixteenth St. viaduct. This viaduct will be built of steel, iron and concrete, and will be about 52 ft. wide. It is estimated to cost $150,000. Property owners interested in the proposed Twenty-fourth St. viaduct presented the City Council a waiver of all damages that might accrue to adjoining property through the building of that viaduct.

REDWOOD, CAL.—The Board of Supervisors of San Mateo County will receive bids until Oct. 31 for building a bridge over Bear Gulch Creek, near Woodside. J. F. Johnston, Clerk.

SACRAMENTO, CAL.—The Board of Supervisors of Sacramento County were recently petitioned by Henry Helb and others for a bridge across Georgianna Slough at Walnut Grove, to connect Andrus Island with the main land. The County Surveyor was instructed to communicate with the Secretary of War, as the Slough is navigable.

SANTA ANA, COL.—Supervisor Armor of Orange County, to whom was referred the petition for a bridge across Santiago Creek, recommends that the bridge be built.

STOCKTON, CAL.—The Supervisors of San Joaquin County have approved plans and specifications for a bridge across the Calaveras River on the Jack Tone Road, and bids for building the same will be opened Oct. 4. A petition for the Benson Ferry bridge, above New Hope, to be changed to a drawbridge was read and referred to the District-Attorney for a report on the law of the case. A petition of residents for a bridge at Terminus or Grand Junction was referred to the County Surveyor to investigate the feasibility of putting a bridge there and the probable cost.

WYCOMBE, PA.—The Newtown Electric St. Ry. Co. of Newtown will build a bridge at Wycombe over the tracks of the North Pennsylvania RR. on the line of the Doylestown trolley extension.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Chicago & Northwestern.—Quarterly, preferred, 1¾ per cent., payable Oct. 6.
Cleveland, Cin., Chicago & St. L.—Quarterly, preferred, 1¼ per cent., payable Oct. 20.
Evansville & Terre Haute.—Preferred, 2 per cent., payable Oct. 15; 2 per cent., payable Apr. 15, 1899.
New York, N. H. & Hart.—Quarterly, 2 per cent., payable Sept. 30.
Pittsb., Youngst. & Ash.—Common, 3 per cent.; preferred, 3½ per cent., payable Sept. 24.
Sunbury & Lewiston.—Four per cent., payable Oct. 1.

Buffalo Ry.—Quarterly, 1 per cent., payable Sept. 15.
Manhattan (Elevated).—Quarterly, 1 per cent., payable Oct. 1.
Union Traction & Electric (Prov., R. I.).—Quarterly, ¾ per cent., payable Oct. 1.
West End (Boston).—Common, 3½ per cent., payable Sept. 17.

Ticket Agents.

The International Association of Ticket Agents held its annual meeting at Detroit, Mich., Sept. 13 and 14. The officers of the Association elected for the ensuing year are: President, Charles Van Campen, Rochester, Minn.; Secretary, C. G. Cadwallader, Philadelphia; Treasurer, Elwood Ramsey, Philadelphia.

Massachusetts Street Railway Association.

At the annual meeting of the Massachusetts Street Railway Association, held in Boston, Sept. 14, the following officers were elected: President, P. F. Sullivan; First Vice-President, John R. Graham; Second Vice-President, E. C. Foster; Secretary, Charles S. Clark; Treasurer, W. F. Pope; Executive Committee, A. A. Glasier, E. P. Shaw, William A. Bancroft, F. H. Dewey, S. M. Thomas; Auditing Committee, John N. Akarman, Robert S. Goff, P. L. Saltonstall.

New York Railroad Club.

The first meeting of the season was held at the rooms of the Club, 12 West Thirty-first street, Thursday evening, Sept. 15. A paper by W. S. Rogers on "Cost Keeping and Accounting" was read and discussed. An abstract of this paper will be given in a later issue. Thirty new members were elected. Prof. H. Wade Hibbard, in a short address, outlined the work to be done this year in railroad mechanical engineering at Sibley College, Cornell University. This course was outlined in our issue of July 29 last. Four hours a week, instead of seven, as there given, will be devoted to the subject of Rolling Stock. At the next meeting of the Club, to be held Oct. 20, Mr. H. B. Hodges, Purchasing Agent and Superintendent of Tests of the Long Island Railroad, will read a paper on "Purchasing Mterials."

The Civil Engineers' Club of Cleveland.

A regular monthly meeting of the Club was held in Case Library Sept. 13. Both presiding officers being absent, Mr. W. R. Warner was chosen President pro tem. The proposed amendment to the constitution, to change the name of the Club, was discussed, and the question finally postponed until the next regular meeting.

Mr. John P. Coffin read a paper on "Some Points of Interest Gathered from an Inspection of the Machinery of Vessels on the Great Lakes, Together with a Synopsis of the Rules Compiled by the Great Lakes Register for Future Construction, and the Reasons for the Same." The paper reported upon the prevailing types of boilers, engines, pumps and other machinery now afloat on the Great Lakes, as ascertained from a critical survey of over 1,300 vessels; it mentioned certain defects in design and proportion, and described the rules adopted to govern future construction. The subject was discussed by Messrs. Oldham and Miller.

PERSONAL

—Mr. James McQueen, Jr., Manager of the Reading Dispatch, died in Detroit, Mich., Sept. 8. He was 44 years of age.

—Mr. Joseph Bayle, at one time President of the New Orleans & Carrollton, died in New Orleans, Sept. 8. He was 65 years of age.

—Mr. James A. Elder, who was at different times president of the Emittsburg RR., died in Emittsburg, Md., Sept. 10. He was 68 years of age.

—Mr. W. S. Alexander, President and General Manager of the Eastern Railway of Minnesota, a part of the Great Northern, died in St. Paul Sept. 4. He was 60 years of age.

—Mr. George H. Hill, a pioneer director and stockholder of the Atchison, Topeka & Santa Fe, died at Wolf Island, Ont., Can., Aug. 27, at the age of 89.

—Mr. John Colley, General Baggage Agent and Superintendent of Dining Car Service of the Chicago Great Western, died in Chicago, Sept. 11, at about 40 years of age. He had been in the emplay of the road from its opening.

—Mr. Gilman Cheney, President of the Canadian Express Co., died in Montreal, Sept. 19, at the age of 76. Mr. Cheney was born in Manchester, N. H., and went to Canada as a representative of an express forwarding agency about 35 years ago.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—George B. Gallon, heretofore Voucher Clerk in the office of the Auditor at Topeka, has been appointed Traveling Auditor, with headquarters at the same point.

Baltimore & Ohio.—Thos. McGill, heretofore Northwestern Traveling Passenger Agent, with headquarters at St. Paul, Minn., has resigned. He is succeeded by R. C. Haase. (Sept. 16, p. 678.)

C. E. Dudrow, Traveling Passenger Agent at Harper's Ferry, has had his territory extended from Keyser, W. Va., to Grafton, W. Va. The territory of John T. Lane, Traveling Passenger Agent at Wheeling, W. Va., is extended to include the line to Cambridge, O., not including that point. The territory of D. S. Wilder, Division Passenger Agent at Columbus, O., is extended to cover the line from Newark, O., south to Midland City, O., and contiguous territory. The territory of F. P. Copper, Traveling Passenger Agent at Newark, O., is extended to cover the line west from Cambridge and Akron, O., including both cities and contiguous territory west of the Cleveland & Marietta. Mr. Copper's headquarters were heretofore at Tiffin, O. The agency there has been abolished.

Baltimore & Ohio Southwestern.—C. P. Fegan, Traveling Passenger Agent at Dallas, Tex., has resigned. He is succeeded by John P. Rogerman, who has been located at St. Louis, Mo., as Chief Clerk to G. B. Warfel, Assistant General Passenger Agent there. Mr. Rogerman is succeeded by Orin B. McCarty.

Canadian Pacific.—W. H. Langridge has been promoted from Traveling Auditor to Chief Auditor on the Pacific Division, with headquarters at Revelstoke, B. C.

Chicago Great Western.—Lucius Oppenheim, heretofore General Agent South St. Paul, has been appointed to a more important position at St. Joseph, Mo.

Chicago, Milwaukee & St. Paul.—J. F. Manter has been appointed Traveling Freight Agent, with headquarters at Kansas City, Mo.

Cleveland, Cincinnati, Chicago & St. Louis.—H. C. Maguire, heretofore Joint Traveling Passenger Agent of this road and the Chesapeake & Ohio, at Dallas, Tex., has been appointed City Passenger Agent of the C., C., C. & St. L., at St. Louis. He is succeeded by W. H. Whittlesey.

W. W. Root, who resigned as General Western Agent, will continue service with the company until Oct. 1, when his resignation will take effect.

Columbus, Sandusky & Hocking.—T. M. Downing, Master Mechanic at Columbus, has resigned, and the duties of the office will be assumed by M. F. Bonzano, Superintendent and Chief Engineer.

Columbus, Sandusky & Hocking.—T. M. Downing, who has occupied the position of Master Mechanic since December last, with headquarters at Columbus, O., has resigned. M. F. Bonzano, Superintendent and Chief Engineer, will assume the duties of that position for the present.

Detroit, Toledo & Milwaukee.—W. E. Stone has been appointed Master Mechanic, succeeding J. W. Whitmer, with headquarters at Marshall, Mich.

Eastern of Minnesota (Great Northern).—George T. Ross, heretofore Train Master, has been appointed Assistant Superintendent, with headquarters at West Superior, Wis.

Esquimalt & Nanaimo.—H. J. Prior, heretofore General Freight and Passenger Agent, has resigned. He is succeeded by Geo. F. Courtney, Local Agent of

the Canadian Pacific at Victoria, B. C. Mr. Courtney's headquarters will be at Victoria, B. C.

Georgia & Alabama.—R. D. Bowles, who was transferred to Columbus, Ga., as General Agent, will return to his old position as General Agent at New Orleans. (Sept. 9, p. 655.) T. C. S. Howard has been appointed Commercial Agent at Columbus, Ga., succeeding W. P. Levis, resigned. Mr. Howard takes charge of the position which Mr. Bowles left. W. F. Patillo, Jr., has been appointed Soliciting Agent, with headquarters at Atlanta, Ga. He succeeds C. W. Chears, who has been appointed Commercial Agent of the Central of Georgia at Columbus.

Great Northern.—W. E. Tew has been appointed Assistant Division Superintendent, with headquarters at Harvey, Mont., vice J. W. Donovan, resigned. Mr. Tew has been heretofore a conductor on the Breckenridge Division.

E. B. Clark has been appointed District Freight Agent at Pittsburgh, succeeding R. H. Martin. Mr. Clark was heretofore General Agent of the G. N. at Detroit, Mich.

Gulf, Colorado & Santa Fe.—The entire general office force will shortly be removed back to Galveston, from Cleburne, Tex., whence they went at the outbreak of the yellow fever scare.

Indiana & Illinois Southern.—W. H. Hawkins has been appointed General Passenger and Freight Agent, with headquarters at Sullivan, Ind. Mr. F. E. Basler was heretofore General Freight, Passenger and Baggage Agent.

International & Great Northern.—Frank M. Cockrell has been appointed Commercial Agent at Kansas City.

Kansas City, Pittsburgh & Gulf.—A. K. Stone has been appointed Assistant General Superintendent and will have charge of the terminals at Kansas City. Mr. Stone's jurisdiction also extends over the Kansas City Suburban Belt, and the Kansas City & Independence. His headquarters are at Kansas City, Mo.

Lake Shore & Michigan Southern.—J. E. Hull has resigned as Northwestern Passenger Agent at St. Paul, Minn., but will continue in the service of the road as General Agent at same point.

Litchfield, Carrollton & Western.—C. M. Stanton, General Manager of the Jacksonville & St. Louis, will operate the L., C. & W., with the title of Agent for the Receiver, with office at Jacksonville, Ill. (Sept. 9, p. 655.)

J. W. Ross has been appointed Train Dispatcher and Car Accountant, with office at Litchfield, Ill.

Louisville & Nashville.—E. A. Peeples has been appointed General Southern Agent of the L. & N. and Nashville, Chattanooga & St. Louis, with headquarters at Atlanta, Ga., succeeding J. A. Sams, resigned. Mr. Peeples was heretofore an assistant to Mr. Sams at Atlanta, Ga.

Mexican Central.—J. H. Feehan has been appointed Chief Train Dispatcher at Cardenas, Mex., for the two divisions betweeen Tampico and Aguas Calientes.

A. L. Buddee, Chief Clerk of the Freight Claim Department, has been appointed Chief Clerk in the Auditing Department, succeeding E. J. Hitchcock. W. W. Rhodes, heretofore Traveling Auditor, succeeds Mr. Buddee.

Mexican National.—H. J. Falkenbach, heretofore Assistant General Passenger Agent at Mexico, Mex., has been appointed Traveling Passenger Agent, with headquarters at 353 Broadway, New York.

Michigan Central.—John G. Laven, Canadian Passenger Agent, with headquarters at Toronto, Ont., has resigned.

L. L. Caufy, Wisconsin Passenger Agent, with headquarters at Milwaukee, Wis., has resigned. His resignation is due to the consolidation of the Vanderbilt roads.

Missouri Pacific.—C. B. Jewell has been appointed Train Dispatcher at Osawatomie, Kan. Mr. Jewell was heretofore Trainmaster of the Mexican Central at San Luis Potosi.

Mobile & Ohio.—E. B. Blair has been appointed Traveling Passenger Agent, with headquarters at Jackson, Tenn. Mr. Blair was heretofore City Passenger and Ticket Agent at Meridian, Miss.

Oregon Railroad & Navigation.—F. R. Hanke has been appointed Contracting Freight Agent of this road at Spokane, Wash. Mr. Hanke was heretofore General Traffic Manager of the Central of Washington.

Plant System.—Z. C. Middlebrooks, heretofore Chief Train Dispatcher of the Central of Georgia at Savannah, has been appointed Chief Train Dispatcher of this system at High Springs, Fla., from which point three divisions are worked.

St. Johnsbury & Lake Champlain.—H. Blodgett of St. Johnsbury, Vt., has been appointed a director, succeeding S. C. Shurtleff of Montpelier.

St. Louis & San Francisco.—E. F. Serviss has been appointed Commercial Agent, and Isaac Powell Traveling Passenger Agent, with headquarters at Kansas City.

St. Louis Southwestern of Texas.—H. E. Farrell, heretofore Assistant General Freight Agent at Tyler, Tex., has been appointed General Freight Agent, with headquarters at the same point, succeeding Geo. W. Barnhart, resigned to accept service with the St. Louis Southwestern at St. Louis, Mo. D. K. Penn has been appointed Traveling Freight Agent at Dallas, Tex. R. D. Fawcett has been appointed Contracting Agent, with headquarters at Dallas, Tex.

Southern Indiana.—F. B. Ogden, recently appointed Vice-President, and C. F. Weinland, Secretary and Auditor, will make their headquarters at Chicago.

Southern Railway.—W. H. Doll, Traveling Passenger Agent, with headquarters at Nashville, Tenn., has been transferred to Norfolk, Va.

Union Pacific.—F. V. S. Crosby has been appointed Treasurer, succeeding Mr. James G. Harris, resigned, with headquarters at Boston, Mass.

The work of reorganizing the Law Department is completed. The legal matters of the road in Nebraska and Iowa will be under the supervision of General Solicitor Wm. R. Kelly, with headquarters at Omaha, Neb. The assistant attorneys will be John N. Baldwin and E. Porter Smith. Their headquarters will be in Omaha, Neb. The general attorney for Kansas will be E. L. Williams. His assistants are N. H. Loomis and R. W. Blair, with headquarters in Topeka, Kan. The general attorneys for Colorado will be Willard Teller and H. Orahood, with headquarters in Denver. The general attorney for Wyoming is John W. Lacey, with headquarters at Cheyenne. The general attorney for Utah is Le Grand Young, with headquarters at Salt Lake City. His assistant is A. W. Agie, with headquarters at Ogden.

Wilkesbarre & Northern.—At a meeting of the Directors, held in Wilkesbarre Sept. 10, the following officers were elected: President, John Schmitt; General Manager and Treasurer, John Graham; Secretary, T. S. Barber. Board of Directors: J. W. Hollenback, E. Troxell, Geo. R. Bedford, John Graham, T. S. Barber, John Schmitt and Pierce Butler.

Yazoo & Mississippi Valley.—H. G. Barrow, Traveling Freight Agent, with headquarters in New Orleans, has resigned. He is succeeded by F. P. Redman, who is at present with Traffic Manager Hurlbut of the Illinois Central in Louisville, Ky.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

BAKEISFIELD & LOS ANGELES.—This company has been incorporated in California to build the extension of the San Francisco & San Joaquin Valley, referred to last week, p. 679, from Bakersfield, Cal., south about 200 miles over the Tejon Pass to Los Angeles. The incorporators are Claus Spreckels, John D. Spreckels, A. B. Spreckels, Robert Watt and A. H. Payson. Mr. Watt and Mr. Payson are Vice-Presidents of the San Francisco & San Joaquin Valley, 321 Market St., San Francisco.

CALIFORNIA EASTERN.—An issue of $684,000 5 per cent. bonds has been placed in London, according to report, for the proposed extension of this line from Nanbel, Cal., to Good Springs, Nev., 47 miles. (Jan. 11, p. 34.)

CANADIAN PACIFIC.—A contract has been let for the tunnel, 3,700 ft. long, 4 miles from Brooklyn, B. C., on the line from Robson west 105 miles to the Midway.

Track is laid on the Crows' Nest Pass extension as far as Moyie City, and there is now every prospect of having the rails laid to Kootenay Lake before the snow flies. A tri-weekly train service is in operation as far as Cranbrook, leaving McLeod on Mondays, Wednesdays and Fridays.

CANADIAN ROADS.—The Kootenay Railway & Navigation Co., recently formed to take over the Kaslo & Slocum and other railroad companies in British Columbia (Sept. 2, p. 638), is locating a line from the foot of House Lake to the Upper Duncan River, up as far as Hall Creek. This line is intended to act as a feeder to the new company's system.

The Bennett Lake & Klondike Navigation Co. has been granted a license by the British Columbia Legislature to build and operate steamers and to obtain charters to build steam and electric roads, particularly to equip and work a railroad from the north end of Marsh Lake to the Hootalinqua River to the railroad on either side of the White Horse Rapids and Miles Canyon. The principal office is London, Eng.; capital stock £75,000.

CHICAGO & WABASH VALLEY.—This company was incorporated in Indiana Sept. 10, with a capital stock of $50,000, to build about 23 miles of road in Jasper County, to connect certain lines owned by Benj. J. Gifford of Kankakee, Ind., with the Illinois Eastern. The incorporators are Benjamin J. Gifford, James E. Jones, Harlan M. Stone, Charles D. Henry, John B. Reed, Edward D. Calkins and Chas. B. Campbell. (Sept. 2, p. 638.)

CHICAGO, MILWAUKEE & ST. PAUL.—In President Miller's annual report the following statement is made: "The second main track from Bensenville to Genoa, and from Davis Junction to Kittredge on the Chicago & Council Bluffs Division in Illinois, has been completed, with the exception of the ballasting. This line is now double-tracked from Chicago to Savannah on the Mississippi, a distance of 138 miles. In all, $1,760,000 has been expended in equipment, second track and third and fourth tracks."

CHOCTAW & MEMPHIS.—This company has been incorporated in Arkansas, with a capital stock of $3,500,000, to extend the Choctaw, Oklahoma & Gulf from Wistar Junction, Ind. Ter., to Little Rock, Ark. (Sept. 16, p. 679.)

CHOCTAW, OKLAHOMA & GULF.—The Choctaw Construction Co. of Newark was incorporated in New Jersey Sept. 15, with a capital stock of $600,000, to build a railroad in Arkansas. Among the incorporators is Francis I. Gowen, 420 Walnut St., Philadelphia, M. Gowen is President of the C., O. & G., which intends to extend its line to Little Rock, Ark. (Sept. 16, p. 678.)

CUMBERLAND & PENNSYLVANIA.—About 1,000 tons of 80-lb. steel rails have been laid this year; this, together with 720 tons laid last year, will make a continuous track of new 80-lb. steel rails from Cumberland to a point five miles beyond Frostburg, Md.

DAVENPORT, ROCK ISLAND & NORTHWESTERN.—This company has been incorporated in Illinois as successor to the Davenport & Rock Island Bridge & Terminal Company, to build the Crescent bridge between Davenport, Ia., and Rock Island, Ill. The capital stock is raised from $1,000,000 to $3,000,000.

DELAWARE.—The State Railroad Commission has approved an increase of capital stock from $200,000 to $260,000, for this line now building from Delhi, N. Y., southeast 18 miles to Andes and Bovina Center. Henry Davis of Delhi is President. (Sept. 2, p. 638.)

DULUTH & NORTHEASTERN.—This company has been incorporated in Minnesota to build a line from a point on the Duluth & Iron Range, near Bassett Lake, to run southeast about 36 miles to Island Lake, on the Colpet River. This is undoubtedly the project of the Duluth Logging & Contracting Co., whose new line was noted in this column for Sept. 2 (p. 639). It is stated that there are 200 men at work on the line, a crew being employed at the junction of the Duluth & Iron Range, and another at Island Lake. The incorporators are: Frederick Weyerhaeuser, St. Paul; J. B. Phelps, a wealthy banker of Davenport, Ia., and H. C. Hornby, J. E. Lynds and J. H. Heininger, all of the Cloquet Lumber Company of Cloquet.

FLORIDA CENTRAL & PENINSULA.—New side tracks are being laid at Fernandina, Fla.

FORT DODGE & OMAHA.—This company was incorporated in Iowa Sept. 14, with a capital stock of $5,000,000, to build a line from Fort Dodge southwest about 125 miles to Omaha, Neb. The incorporators are J. F. Duncombe, Fort Dodge; Charles E. Grafton, Niven C. Phillips, Henry B. Litchfield and Clarence A. Moore of Chicago. It is reported that the Illinois Central is back of the project.

GREAT NORTHERN.—Work is begun in Seattle on the system of wharfs and terminal facilities at that point. Pile-drivers are at work and dredges are being secured to dredge the proposed canal.

HOLLY RIVER & ADDISON.—This company has been incorporated in West Virginia to build a line from Palmer Junction on the West Virginia & Pittsburgh, southeast about 15 miles to Addison. The incorporators are: George W. Curtin of Sutton, John M. Marple of Marpleton, Charles R. Durbin of Grafton, J. H. Brewster of Brewster, John T. McGraw of Grafton, and George W. Hechmer of Palmer, W. Va.

LAKE ERIE & WESTERN.—In Vice-President and General Manager Geo. L. Bradbury's report it is stated that 248 pile and trestle bridges, aggregating 27,045 lin. ft., were repaired and renewed. In addition, one 70-ft., one 41-ft. and two 40-ft. steel plate girders, resting upon masonry abutments, were built. There were 20 wood trestles and culverts replaced with iron pipe, varying from 12 to 48 in. in diameter. About one and a half miles of new sidings were built, and about the same amount taken up; 98 miles of main track, extending from Kirk's, Ill., to Wesley Junction, Ill., was ballasted.

LEHIGH VALLEY.—Work is begun at Sayre, Pa., on a coaling station and trestle, which will cost about $20,000. The contractor is W. B. Wilson of Buffalo.

MEXICAN CENTRAL.—Arrangements have been completed, according to report, for building a road in the state of Jalico from Orendian northwest 30 miles to Tequila. The Mexican Central is also reported to be negotiating for buying the section of the Michoacan & Pacific now building from Yurecuaro, Mex., southeast 300 km. (186 miles) to Ario. (June 3, p. 399.)

MEXICAN ROADS.—Final arrangements are said to be perfected for building the railroad from Guadalajara, state of Jalisco, south about 100 miles to Zapotalan. This is under a concession of the Mexican Government to Senor Ignacio Borda of Mexico City. (April 1, p. 245.)

NATCHEZ, RED RIVER & TEXAS.—A side track one-half mile in length is being built at Vidalia, La., connecting the road with the Union Oil Company's mill and bringing the line into close connection with the Vidalia sawmill. The grading is being done by A. H. Gillespie. The company is laying the rails, and expects the siding to be finished by Oct. 1.

NATIONAL TEHUANTEPEC.—A Mexican paper publishes certain facts as follows, from the monthly circular of the management of the steamboats plying on the rivers in the southern portion of Vera Cruz, with reference to this road, recently acquired by Sir Wheatman Pearson & Son, as follows:

Under concessions from the Federal Government the Pearsons are now building a branch line from Juile, a station on the Tehuantepec line, to San Juan Evangelista, the head of navigation on the San Juan River, and expect to have this line in full operation before the end of December next. From San Juan two branches are contemplated, one to San Andres Tuxtla and the other to San Nicolas; the former will branch off from the latter at a point on the San Juan River near La Cerca. Under the concession the line may extend from San Nicolas to Tlacotalpam and Alvarado, but it is not yet settled whether the extension will be built, as the river furnishes ample transportation facilities. The Pearsons intend to construct and operate a complete system of transportation for the entire gulf coast, and to carry out this intention are even now having surveys made to determine the advisability of building a railroad from Playa Vicente to Paso Nuevo, which would bring some of the richest Oaxaca districts into rapid communication with the coast.

NEW ROADS.—The line from Racquette Lake, N. Y., west 19 miles via Eagle Bay to Clearwater, N. Y., on the Adirondack Division of the New York Central & Hudson River, is completed. Several miles of this line runs through state lands, contrary to the Constitution of the state, and litigation is in progress. The road was completed about Aug. 5. (July 15, p. 522.)

NEW YORK CENTRAL & HUDSON RIVER.—The elevation of the tracks at Albany, N. Y., will be begun shortly. It is expected that the expenses will amount to $75,000, of which Albany will pay one-fourth.

NORFOLK & WESTERN.—In the annual report of President Henry Fink the following remarks are noted: "96.23 miles of main and second track have been relaid with 85-lb. steel rails, and 42.1 miles with 75-lb. steel rails; 74.8 miles of road have been fully ballasted; 115 lin. ft. of wooden trestles have been replaced by masonry and embankments; 965 ft. of wooden trestle have been replaced by iron and steel structures; 2,046 lin. ft. of old, weak bridges have been replaced by strong steel structures; 20.43 miles of new sidings and extensions of old sidings have been constructed during the year; 67 miles of old sidings and branches for which there is no longer use have been taken up. The net increase in length of sidings, therefore, is 13.72 miles; 5.21 miles have been added to the second track."

NORTHERN PACIFIC.—A circular has been issued by this company announcing the completion of several branches. The Rocky Fork branch, starting from Rockvale, Mont., 10 miles south of Laurel, has been extended 20 miles south along the Clark's Fork of the Yellowstone to Bridger and Gebo. (Sept. 9, p. 656.) The Twin Bridges branch is completed to Twin Bridges, Mont., 26.1 miles, via Renovo, Waterloo and Iron Rod. (May 13, p. 348.) The Spokane & Palouse branch has been extended from Pullman, Idaho, to Lewiston, 22.6 miles. (Aug. 26, p. 619.) The circular states that the Manitoba branch, now building from Belmont west 51 miles to Hartney on the C. P. R., is nearly completed. (July 1, p. 458.)

Traffic over the Logan-Butte Branch has been resumed after a period of 18 days. The suspension of traffic was due to the destruction of two of the largest bridges by fire. Bridge No. 60, a 620-ft. trestle 16 miles from Butte, and bridge No. 39, a 300-ft.

structure two miles east of Pipestone Springs, were destroyed. These have both been rebuilt.

The Chief Engineer writes that no extension is contemplated up Nine-Mile Canyon, Idaho, on which work was begun recently, according to report. (Sept. 2, p. 639.)

PENNSYLVANIA.—A letter from the General Manager of the West Jersey & Seashore states that nothing is known at that office about the building of a line from Somer's Point, N. J., to Ocean City. (Sept. 9, p. 656.)

PHILADELPHIA & READING.—Smith & Campion of Mahanoy City, Pa., are reported to have the contract for building the extension about 1.5 miles long at Shippensburg, Pa., to connect the Reading line with the Western Maryland. The new line will shorten the distance by about one-half mile, and avoid heavy grades in the present connecting track. (Aug. 12, p. 587.)

PITTSBURGH, JOHNSTOWN, EBENSBURG & EASTERN.—A mortgage for $150,000 in favor of the Union Trust Company, Philadelphia, was entered in Blair County, Pa., Sept. 13, against the Altoona & Beach Creek Terminal of the P., J. E. & E. The proceeds are to be used for building the line, and it is stated that contracts are let to E. M. Wilkins. The Terminal portion of the road is to run from Altoona to Juniata Junction. (Dec. 24, 1897; p. 919.)

PORTLAND & RUMFORD FALLS.—In the report of Vice-President Pettingill it is stated that at Hartford, Me., extensive improvements have been made, both in alignment and grades. The summit has been reduced by cutting, and approximately 16,000 yards of ballast used. The Mechanic Falls yard has been rebuilt. Sidings at Minot, Hartford, East Peru and Peru have been lengthened. One mile of the standard 70-lb. steel rails has been laid on the main line.

PORTLAND, VANCOUVER & YAKIMA.—This company proposes to make 170 miles of extension from Vancouver, Wash., northeast to Yakima. (Sept. 2, p. 639.) Engineers are now in the field locating the line for an immediate extension of 16 miles. (Official.)

POTOSI & RIO VERDE.—This company was incorporated in New York Sept. 16, with a capital stock of $200,000, to build a narrow gage railroad in the state of San Luis Potosi, Mexico, from the City of San Luis Potosi, southeast 66 miles to Rio Verde. The Directors are: Donald C. Brown of San Luis Potosi, Robert S. Towne, George F. Peabody, Edward M. Shepard, A. Foster Higgins, Charles J. Nourse, Jr., Herbert H. Dean, Samuel H. Ordway and Francis N. Holbrook of New York City. The construction company, of the same name and with the same incorporators, was incorporated in New Jersey last December. (Dec. 31, 1897, p. 936.)

ST. LOUIS & OKLAHOMA CITY.—This company has the entire 103 miles of grading done from Sapulpa, Ind. Ter., west to Oklahoma City, Okla. Ter. Track is laid from Sapulpa to Wellston, 58 miles, and trains are running from Sapulpa to Stroud, Okla. Ter. There are about 600 men at work, but very few teams. The road when completed is to be operated by the St. Louis & San Francisco. (Official.) T. G. Jones of Oklahoma City is President. (Aug. 12, p. 587.)

SAN FRANCISCO & SAN JOAQUIN VALLEY.—Contractors are grading on the portion of the line immediately west from Stockton, Cal., and on that portion of the line immediately adjacent to Franklin Tunnel, just back of Martinez. (Sept. 16, p. 679). Four dredgers are at work on the section across the marshes west of Stockton, and work is just begun on the pile trestling on this part of the line. On the Franklin Tunnel, when completed to be 5,600 ft. long, work had progressed on Sept. 7 as follows: East end tunnel completed 551 ft., heading 30 ft. beyond; west end, total completed 843 ft., heading 26 ft. beyond. (Official.)

SANTA FE, PRESCOTT & PHOENIX.—Track is laid for 17 miles to a point about a mile beyond Bowers' Ranch on the Phœnix & Eastern extension from near Phœnix, Ariz., south 26.4 miles to Mayers. The grading for the entire distance is completed, and the company hopes to have rails laid into Mayers by Oct. 1. (July 22, p. 539.)

SOUTHERN PACIFIC.—The tracks in California have already been ballasted, except the portion from Lathrop to Fresno, Cal. Ballasting crews are busily engaged in completing that portion of the track.

SOUTHPORT TERMINAL.—This company was incorporated in North Carolina Sept. 13, with a capital stock of $250,000, with a right to increase to $800,000, to build a terminal line at Wilmington, N. C., connecting the railroads with deep sea wharves at Southport. The main office is to be at Southport.

TORONTO & HUDSON BAY.—W. T. Jennings, Toronton, Ont., Consulting Engineer and Secretary, has returned to Toronto after making a preliminary survey of the Temegami and Wehuapital districts toward Hudson Bay. Mr. Sankey was sent on to James Bay to explore the bar at the mouth of the Moose River and has not yet returned. The road, as projected, is to connect Toronto with Hudson Bay at Moose Factory. (July 15, p. 522.)

UTAH & PACIFIC.—Preliminary surveys are reported completed on this line from Milford, Utah, southwest 80 miles to the Nevada state line. The surveyors found the old Pioche grade in good condition, except at points where it was intended to put in culverts. At these places about 17,000 cu. yds. of dirt have been washed away. A. W. McCune of Salt Lake City, Utah, is President. (Sept. 2, p. 639.)

WABASH.—At the annual meeting of the stockholders, held at St. ouis Sept. 13, it was decided to buy, lease or build railroads from East Hannibal, Ill., north 15 miles to Quincy, and from Moulton, Ia., north 27 miles to Albia. (July 22, p. 539.)

In the report of Vice-President and General Manager J. Ramsey, Jr., it is stated that 833.8 miles, or about 92,249.2 tons, of new steel rails have been laid since 1896; 1,020 miles of main track have been ballasted, including 250 miles burnt clay ballasting in place of dirt in main line between St. Louis and Kansas City; $108,798 has been spent in reducing grades and sags, while 3.56 miles of trestles have been removed by filling in solid embankment with open waterways closed with iron pipe at a cost of $200,000; 32 old bridges have been replaced with heavy iron bridges at a cost of $518,166; 116.6 miles of new side track were built at a cost of $466,000.

WATERVILLE & WISCASSET.—The city of Waterville, Me., has voted $10,000 in stock in aid of this road, projected from Weeks Mills, Me., north 13.3 miles via China, East and North Vasselboro and Winslow to Waterville. A director of the company is reported to have stated that enough capital is now in sight to insure beginning the grade, and that the road will be completed from Weeks Mills to the bridge over the Kennebec, near Waterville, before Jan. 1. Frank Redington is President and John H. Burleigh Chief Engineer, both of Waterville, Me. (May 20, p. 367.)

WHITE RIVER, LONOKE & WESTERN.—Track is laid for four miles on the extension from Lonoke, Ark., toward Seaton. Trains are running the entire distance from Wooley to Kirkpatrick, though ballasting is not completed on the last four miles. There are 35 men and two teams at work. All the bridges are completed. (Official.) John N. Wooley of Jacksonville, Ark., is General Manager. (June 3, p. 399.)

YAZOO & MISSISSIPPI VALLEY (Illinois Central).—The Louque Plantation, above Southport, La., consisting of about 1,200 acres, has been purchased by the I. C. in the interest of the Y. & M. V., for the purpose of building a sorting yard thereon. It is not proposed at this time to make any improvements on the river front. (Official.)

Electric Railroad Construction.

BEAUMONT, TEX.—The City Council granted a petition from J. C. Ward, E. L. Bacon, James F. Ward, V. Wiess, T. H. Langham and J. F. Keith for a franchise for an electric street railroad. The franchise will cover a period of 50 years, the petitioners to begin work within three months and give bond that the road will be properly built, equipped and operated. The petitioners are all citizens and stockholders in the electric light company.

BOSTON, MASS.—Permits for laying additional track have been granted the Boston Elevated RR. Co. as follows: Bunker Hill St., from the Present terminus to Main St., Charlestown Neck; Commonwealth Ave., from Brighton Ave. to the Chestnut Hill and Commonwealth Ave. connections.

The Boston Elevated RR. has about 600 men at work on a new line of double track from Mount Auburn through Belmont to Waverley, Waverley Oaks and the McLean Asylum, about 2¼ miles in all.

Double track is being laid in Everett, from Ferry St. to the Woodlawn Cemetery, heavy rails being used instead of the old single-track T rail. There now remains but one line of single track on the entire system of the Boston Elevated RR., that on Cambridge St., from Brighton along Beacon Park. This will also be changed.

Broadway, Everett, is being regraded to the Maplewood station, new tracks are going in place at City Square, Charlestown, and several changes are in progress about the new terminal station.

CHATTANOOGA, TENN.—The Chattanooga Rapid Transit Co. has broken ground for a power house at Highland Park to supply the East Lake extension.

CHICAGO, ILL.—It is stated that work on the Northwestern Elevated RR., which has been interrupted for two years, will be resumed within a few days. About 4,000 cubic ft. of stone has been bought for foundations between Chicago and North avenues. It is expected to have the road completed by February. An issue of $4,500,000 has been floated by New York financiers and completely subscribed for at 90. Most of these bonds were taken by New York and the balance by Chicago parties.

CINCINNATI, O.—The Cincinnati & Hamilton Electric Ry. has filed a mortgage made to the American Trust Company to secure a bond issue of $500,000. (May 1, May 20, pp. 189, 367.)

DEDHAM, MASS.—The projectors of the Norfolk Western St. Ry. Co. have applied to the State Railroad Commissioners for the approval of their plans for building a trolley road from Dedham to Medway, about 15 miles. There is a strong opposition to the project in Dedham.

ERIE, PA.—The Railroad Committee of the Erie City Council has amended the ordinance granting the Erie Motor Co. authority to lay additional lines east of East Ave. by striking out that portion of the 3 per cent. clause applying to the East 6th St. line.

INDEPENDENCE, MO.—Press reports state that F. W. Sears, 3 and 7 Baird Building, Kansas City, Mo., is interested in a company being formed to build about 10 miles of trolley road at Independence and in other parts of Jackson County.

JOHNSTOWN, PA.—The Board of Trade has organized a committee to promote plans for building a trolley road to Scalp Level. Secretary Thompson of the Board says that such a road will be built in the immediate future.

KNOXVILLE, TENN.—The Knoxvlle St. Ry. Co. has completed an extension from Knoxville to Lake Chilhowie, 5 miles.

LONG ISLAND CITY, N. Y.—The New York & North Shore Ry. Co. has secured permission from the State Railroad Commission to build its proposed road 30 miles long from a connection with the existing electric railroad of the New York & Queens County Ry. Co. in the town of Newtown easterly to Jamaica, and thence northerly to Flushing and Whitestone and easterly to Bay Side and Manhasset. (April 29, July 8; pp. 317, 503.)

MANKATO, MINN.—J. B. Canterbury of La Crosse, Wis., is trying to get a franchise to build an electric road in Mankato, according to reports.

NATICK, MASS.—The Natick & Cochituate St. Ry. Co. has petitioned the State Railroad Commissioners for permission to extend their line to Needham, there to connect with the line of the Newton & Boston St. Ry. which has recently been extended. The end of the petitioning line is now at South Natick, while the Newton & Boston line crosses at right angles in Auburndale the tracks of the line connecting with the Wellesley & Boston St. Ry., which runs to the terminus in Framingham, through Natick, by way of Newton Lower Falls.

NEWTOWN, PA.—Thomas P. Chambers, President of the Newtown Electric St. Ry., says that the contract to build the extension to Doylestown has been awarded to Thomas H. Connell of Philadelphia. The contract calls for the completion of the work by Dec. 15. The new road will be 14 miles long, and will cross the North East Pennsylvania RR. at Wycombe by an overhead bridge. The Newtown Electric St. Ry. now controls the entire line from Newtown to Bristol, and when the Doylestown extension is completed will have 28 miles of trolley road. (July 22, Sept. 2, pp. 539, 639.)

NEW YORK, N. Y.—It is reported that the Metropolitan St. Ry. Co. and the Third Avenue RR. Co. will make a joint application for a franchise for an electric road extending to the Yonkers line over the Kingsbridge Road and adjacent streets. A franchise for such a line over the Kingsbridge Road was granted by a former Board of Aldermen to the Third Avenue Company and the company had dug a long trench in the Kingsbridge Road, when the courts interfered and stopped the work. That trench has remained unfilled for nearly two years, and only recently the courts decided that the Commissioner of Highways could go ahead and fill it up at the expense of the Third Avenue Company.

NYACK, N. Y.—The Nyack Traction Co. is organized to build an electric railroad in Nyack. The officers are as follows: H. C. Howard, President; E. F. Walker, Treasurer; G. D. Howell, Secretary.

OREGON CITY, ORE.—W. H. Burghardt was granted a franchise by the court of Clackamas County, to build an electric railroad on the county road from the city limits to Wilhoit Springs. Work must begin on the road within one year, and cars must be running within two years. The promoters of the road say that it will be 40 miles long, including a branch line. A petition has been presented to the City Council asking for a right of way on several streets, in order to make connection with the proposed road. (Aug. 26, p. 619.)

PERTH AMBOY, N. J.—The Perth Amboy Board of Aldermen received a new application for a franchise from the Perth Amboy & Sewaren Electric St. Ry. Co. The company wishes to enter the city via Railroad Ave., now being opened, at Woodbridge Creek, the city line. An exclusive right to Railroad Ave. and State St., practically one thoroughfare, is asked, and the company seeks also the right to run cars on Smith St. from State St. to the Staten Island ferry at the foot of the street. Among the incorporators of this company are: C. W. Boynton, Woodbridge; Henry Maurer and Robert De Forest, New York; Garret Broadhead and Patrick Comery, Perth Amboy.

PITTSTON, PA.—Local papers state that J. B. Reynolds of Wilkesbarre is interested in a project to build an electric road from Pittston to Scoville Island in the Susquehanna River.

PORTLAND, IND.—The Portland & Camden RR. Co. is incorporated to build and operate an electric railroad 12 miles long between Portland and Camden. Capital, $50,000. Incorporators, Albert Grisell, Pennville; Hugh Kapp, Toledo, O.; G. A. Mason and N. A. Todd, Bluffton; Frank S. Vine, H. T. Cook, George E. Terrill, James Droege, Martin Toohey and W. J. Cook, Cincinnati, O.; W. B. Cooley, Hartford City; T. W. Bradstreet, Montpelier; D. E. Studebaker, L. G. Kapp and I. S. Kapp, Bluffton.

QUAKERTOWN, PA.—The Quakertown Traction Co. has begun work on an extension of a few miles to Trumbauersville. After this extension is completed a line will be built from Quakertown to Coopersburg, where connections will be made with trolley lines reaching Bethlehem and Allentown.

ST. CATHERINE'S, ONT.—The St. Catherine's & Niagara Central Ry. was recently bought by Messrs. Haines Bros., 100 Broadway, New York. It is quite probable that the motive power will be changed from steam to electricity. The road is 13 miles long and 2 locomotives and 4 cars are operated.

ST. LOUIS, MO.—Local papers state that the United Traction Company will begin this fall on the roadbed for its proposed trolley road, to run through St. Louis and Jefferson counties to De Soto. This line will form a suburban connection of the Union Depot RR. Co. The incorporators are John Scullin, President; James Campbell and Harry Scullin. (Apr. 1, p. 247.)

TERRE HAUTE, IND.—The committee of the first mortgage bondholders report that 87 per cent. of the bonds have been deposited. The time for receiving the bonds is extended to Oct. 1.

WHEELING, W. VA.—The Wheeling & Elm Grove RR. has completed the change of motive power from steam to electricity. The company will operate 8 miles of double track.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the dates named:

June 30.		1898.	1897.	Inc. or Dec.	
Baltimore & Ohio Southwestern.					
1 month	Gross	$539,546	$531,420	I.	$8,126
1 "	Net	96,287	189,594	D.	93,307
12 months	Gross	6,904,317	6,140,000	I.	764,317
12 "	Net	1,987,511	1,882,695	I.	104,816
Chicago, Indianapolis & Louisville.					
12 months	Gross	$3,323,671	$2 902,760	I.	$420.911
12 "	Net	967,664	860,322	I.	107,341
Illinois Central.					
12 months	Gross	$27,317,820	$22,110.938	I.	$5,206,882
12 "	Net	8,662,350	6,375,054	I.	2,287,296
New York, New Haven & Hartford.					
3 months	Gross	$7,614,740	$7,912,547	D.	$297,807
3 "	Net	1,934,484	2 464,671	D.	530,187
12 months	Gross	30,322,738	29,623,332	I.	699,406
12 "	Net	9,431,052	9,580,976	D.	149,024
Philadelphia & Reading.					
1 month	Gross	$1,829,264	$1,678,800	I.	$141,464
1 "	Net	779,248	631,359	I.	147,889
12 months	Gross	21,986,834	20,616 264	I.	1,370.570
12 "	Net	9,600,805	8,898,804	I.	702,001
Philadelphia & Reading Coal & Iron Co.					
1 month	Gross	$1,595,103	$1,879 290	D.	$284,187
1 "	Net	*93,174	*41,851	I.	51,323
12 months	Gross	22,909,553	21,427,080	I.	1,482,473
12 "	Net	476,238	95,366	I.	380,872
* Net loss.					
St. Louis & San Francisco.					
12 months	Gross	$6,886,468	$5,993,336	I.	$893,132
12 "	Net	2,856,359	2,509,708	I.	346,651

July 31.		1898.	1897.	Inc. or Dec.
Central Pacific. (S. P. Co.)				
1 month	Gross	$1,300,119	$1,400,578	D. $100,459
1 "	Net	521,333	637,012	D. 115,679
Long Island.				
1 month	Gross	$535,999	$525,925	I. $10,074
1 "	Net	245,748	247,273	D. 1,525
Long Island System.				
1 month	Gross	$626,017	$609,873	I. $16,144
1 "	Net	297,027	297,431	D. 404
Mssouri, Kansas & Texas.				
1 month	Gross	$752,805	$807,918	D. $55,113
1 "	Net	121,457	194,374	D. 72,917
Philadelphia & Erie.				
1 month	Gross	$369,516	$391,338	D. $21,822
1 "	Net	125,597	104,417	I. 21,180
7 months	Net	568,894	581,913	D. 13,019
Rio Grande Western.				
1 month	Gross	$271,807	$306,797	D. $34,990
1 "	Net	86,656	137,075	D. 50,419

August 31.		1898.	1897.	Inc. or Dec.
Chicago Great Western.				
1 month	Gross	$526,440	$488,693	I. $37,747
1 "	Net	209,188	180,382	I. 28,806
Nashville, Chattanooga & St. Louis.				
1 month	Gross	$525,933	$490,718	I. $35,215
1 "	Net	209,965	180,210	I. 29,755
2 months	Gross	1,075,464	970,996	I. 104,468
2 "	Net	429,855	360,869	I. 68,987
Pittsburgh, Cincinnati, Chicago & St. Louis.				
1 month	Gross	$1,389,807	$1,322,494	I. $67,313
1 "	Net	478,341	508,676	D. 30,335
8 months	Gross	10,160,983	9,349,726	I. 811,257
8 "	Net	2,489,203	2,726,381	D. 237,178
Rio Grande Western (Estimated).				
1 month	Gross	$271,500	$279,000	D. $7,500

BALTIMORE & OHIO.—Chicago press reports state that Philip D. Armour, Marshall Field and Norman B. Ream, executors of the George M. Pullman estate, all of Chicago, have obtained a controlling interest in the B. & O., and have made James J. Hill, President of the Great Northern, a dominating factor in the reorganization of the system. Mr. Hill, in reference to this report, says:

Any connection I may have with the Baltimore & Ohio is simply for the purpose of putting that road on its feet and making it what it was at one time—one of the most important roads in the country. Recently it has failed to such an extent that it was an incubus. Any connection I may have with regard to the Baltimore & Ohio has no connection with the Great Northern. Neither has the Great Northern nor myself any connection with any railroad between St. Paul and Chicago, and, furthermore, neither do I expect to have any such connection.

This statement seems to settle the question of a through line from the Atlantic to the Pacific by means of these two systems. Yet newspaper speculations are rife as to the probable connection between the two lines from Chicago to St. Paul. President E. R. Bacon of the B. & O. Eouthwestern is reported to have stated that a number of representative men identified with large railroad, manufacturing and commercial interests in the Northwest, Chicago and New York and other cities on the B. & O.'s line, have been for some time negotiating for the purchase of more substantial interest in the B. & O., and that negotiations have been brought to a successful conclusion. Under the reorganization ample means have been provided for cutting down grades, increasing the capacity and facilities of the road and putting it into a condition to promptly and economically handle largely increased business. The reorganization managers have also decided that the subsidiary lines, including the B. & O. Southwestern, should be likewise treated, and that arrangements were being concluded to readjust the plans of such lines and to obtain capital to put them in the same condition as the main line. Receiver J. K. Cowen, with reference to this sale, is reported as follows:

It is true that a large interest, a very large interest, in the Baltimore & Ohio has been purchased by Messrs. Field, Hill, Ream, and Armour, as well as other influential men. As to those concerned and the amount of their purchase, the reorganization managers only can answer. It is difficult to define a control. The men who have become interested in the property are of a character to exercise a dominating influence.

Mr. Cowen declared that the progress of reorganization would not be affected in the least by the transfer. On Sept. 19 the reorganization managers brought suit in the United States Court at Baltimore for the foreclosure of the $29,600,000 consolidated mortgages held by the Mercantile Trust & Deposit Co. of Baltimore. The mortgage was executed Dec. 19, 1887, and covers the entire system, including the rolling stock. The foreclosure was brought because of the failure last month to pay interest on the bonds, $470,900 being due. The reorganization managers, however, will not proceed to the extremity of actual foreclosure unless compelled to do so, since this would deprive the company of the special Maryland state charter, whereby $5,000,000 of the capital is exempt from taxation.

CENTRAL VERMONT.—Press dispatches from Vermont state that application will be made in the next General Assembly of the state for a charter to own and operate this railroad and its leased lines. The C. V. has been in the hands of a receiver since March 19, 1896. (May 13, p. 349.)

CHICAGO & ATCHISON BRIDGE.—Holders of receipts of Central Trust Co., New York, or the Citizens' Saving & Loan Association of Cleveland, for deposited bonds are notified that upon presentation of the same to either depositaries new securities of the Atchison & Eastern Bridge Co. will be delivered, in accordance with the reorganization plan detailed in this column for Sept. 3, 1897, p. 627.

CLEVELAND, LORAIN & WHEELING.—Kean, Van Cortlandt & Co. and Esterbrook & Co. have bought from this company $700,000 of first consolidated 5 per cent. gold bonds of 1933, being the balance of the issue reserved to retire a like amount of Cleveland, Tuscaroras & Wheeling first mortgage 7 per cent. bonds ($700,000 outstanding), due Oct. 1. These first consolidated mortgage bonds now become an absolute first mortgage on the property of the company.

INDIANA, ILLINOIS & IOWA.—At the meeting of the stockholders at Chicago Sept. 15 it was voted to accept the proposition to consolidate this company with the Indiana, Illinois & Iowa of Indiana, which owns the 34.55 miles from Knox to South Bend, Ind. This portion of the road is operated by the parent company under a 99-year lease. (Aug. 5, p. 572.) It was also decided to issue $3,000,000 of 50-year 5 per cent. bonds, of which $2,500,000 will be used in taking up old bands, and $500,000 for extensions and betterments.

NEW YORK, ONTARIO & WESTERN.—Kuhn, Loeb & Co. of New York, have bought enough bonds of this company to pay off the $5,600,000 first mortgage 5 per cent. bonds, which, under the terms of that mortgage, may be called June 1, 1899, at 105. By this refunding the company will save $40,000 interest, and the new bonds, which run until 1992, become an absolute first mortgage to cover all the property of the company, including equipment. (Feb. 18, p. 102.)

OHIO SOUTHERN.—Judge Ritchie, at Toledo, O., Sept. 13, decided against the O. S. in the case brought by the English Car Trust Co. The railroad bought 1,700 box cars, agreeing to pay $6,000 per month. After the failure of the road, the Trust Co. demanded the cars, and the Receiver refused to return them. (Aug. 26, p. 620.)

POUGHKEFPSIE & EASTERN.—The foreclosure sale of this road has been postponed for three months. It went into the hands of a receiver June 17. (June 24, p. 468).

SALISBURY & HARVEY.—A receiver has been appointed by the New Brunswick courts for this road on application of the People's Trust Co., New York. The line was formerly known as the Albert Ry., and runs from Salisbury, N. B., on the Moncton & St. John branch of the Intercolonial, through a number of fishing and shipbuilding villages to Albert, on the Bay of Fundy, 45 miles. The ordinary capital stock and charter was $150,000, all paid; bonded debt, $250,000; the Government loan was $29,665; Provincial Government bonds paid, $445,000; municipal bonds paid, $70,000; making the total subscribed capital $954,665; paid up, $704,391. There is a floating debt of $3,000, bearing 7 per cent. The equipment is small and the gross earnings for the year were only $23,486, the operating expenses being $24,013. The receiver appointed by the court is J. R. Abney, a New York lawyer, who was not required to give security and was ordered to file his accounts every six months.

SEABOARD AIR LINE.—The committee of which Wm. H. Blackford of New York is chairman has agreed upon a plan for readjustment of the debt of the Central Carolina as follows: The owners of the $2,000,000 6 per cent. first mortgage, due July, 1920, are to receive for each $1,000 bond a new 4 per cent. first mortgage bond, guaranteed by the Seaboard & Roanoke—(which partially controls the road), for $1,250. In 1894 the S. A. L. guaranteed 4 per cent. per annum for five years on these bonds, giving 5 per cent. non-accumulative income scrip for the remaining 2 per cent. By this agreement the overdue coupons of July, 1894, were paid in the folowing October. (Aug. 5, p. 572.)

SOUTH BOUND (Florida Central & Peninsula.)—The Mercantile Trust & Deposit Co. of Baltimore Md., and the Baltimore Trust & Guarantee Co. have bought $1,500,000 5 per cent. bonds of the S. B., which have been held by the Mercantile Trust & Deposit Co., as trustees of the Savannah Construction Co.

SOUTH CAROLINA & GEORGIA EXTENSION.—This company was incorporated in North Carolina Sept. 14, with a capital stock of $500,000. It owns the property and franchises of the Ohio River & Charleston, and the charter gives it power to operate a railroad from the South Carolina line north via Marion to the Tennessee line, 140 miles. The incorporators are: Samuel Hunt, of Cincinnati; Simon A. Stearn, John J. Collins, Geo. H. Earle, Jr., and Evans R. Dick, of Philadelphia, and P. J. Sinclair, of Marion, N. C.

WHEELING & LAKE ERIE.—The Reorganization Committee announces that a further installment is due of $2 per share on common stock and $3 per share on preferred stock, payable on or before Sept. 29 at the Central Trust Co. of New York. This is the third installment under the plan of reorganization. (Aug. 18, p. 604.)

WISCONSIN CENTRAL.—In reply to the order of Judge Seaman, Edward Abbot has entered an answer in which he claims that the reason he does not surrender $924,000 of improvement bonds of the W. C. is that during the hard times of 1893 he lent his credit to the company to carry its floating indebtedness to the extent of $976,000, taking these bonds as security. Mr. Abbot insists that they are not applicable to the indebtedness of the company and are not to be considered as an asset, except by way of substitution. (July 29, p. 556.)

Electric Railroad News.

CHICAGO, ILL.—At Chicago on Sept. 14, Judge Showalter entered an order in the United States Circuit Court, authorizing the Metropolitan West Side Elevated RR. to increase its plant by the erection of two engines of 2,000 h. p. each to cost $173,000. The petition of D. MacAllister, Receiver, states that additional engines are necessary to meet the increased traffic due to the use of the Union Loop. In May last the court authorized the company to enlarge its power station and equipment at a cost of $146,000. (June 10, p. 421.) According to the report of the Receiver of this road, which was filed in court Sept. 15, the passenger earnings for August show an increase over July. In August the road carried 1,783,798 passengers, a daily average of 57,541, as against 1,624,726, a daily average of 52,410 for July, and 1,799,663 in June. The following is the report for August and compared with July:

Receipts.

	July.	August.
Cash balance forward	$259,816.91	$262,134.23
Railway fares	81,236.30	89,189.90
Rents, privileges, etc	3,734.15	5,229.11
Total	$344,787.36	$356,533.24

Disbursements.

Account special orders court.	$18,858.57	$20,709.82
Pay rolls	30,696.35	32,087.79
Managerial and supplies	33,098.21	25,188.70
Trust fund coupons	.....	50.00
Cash on hand end month	262,134.23	278,516.93
Total	$344,787.36	$356,533..24

FITCHBURG, MASS.—The Fitchburg & Suburban St. Ry. Co. has made an application to the State Railroad Commissioners for approval of a new issue of stock.

LOS ANGELES, CAL.—Local papers state that the Los Angeles Ry. has come into the possession of new owners, as follows: C. P. Huntington, H. E. Huntington, I. W. Hellman, Antoine Borel and Christian de Guigul, all of San Francisco.

NEW YORK, N. Y.—The folowing is the report of earnings and expenses of the Metropolitan St. Ry. Co. for the fiscal year ending June 30, 1898, and compared with 1897:

	1897-8.	1896-7.	Inc. or Dec.
Gross earnings	$9,938,505	$5,888,803	I. $1,049,702
Operating expenses	5,300,436	4,810,235	I. 490,201
Net earnings	$4,638,069	$4,078,568	I. $559,501
Other income	647,297	515,803	I. 131,494
Total net income	$5,285,366	$4,594,371	I. $690,995
Interest on bonds	$590,486	$470,000	I. $120,486
Taxes	552,856	513,449	I. 39,407
Rentals, etc.	2,296,466	2,171,801	I. 124,665
Total charges	$3,439,808	$3,155,250	I. $284,558
Balance, surplus for dividends	1,845,558	1,439,121	I. 406,437
Dividends	1,500,000	1,200,000	I. 300.000

PHILADELPHIA, PA.—John Lowber Welsh has resigned the presidency of the Union Traction Co. The Directors, at the meeting on Sept. 19, decided upon an assessment of $5 a share upon all stockholders, making $17.50 paid in on a par value of $50.

PORTLAND, ORE.—The City & Suburban Ry. will build an extension of about a mile in the North End.

ST. LOUIS, MO.—The Fourth Street & Arsenal Ry. was sold at auction Sept. 20 on the foreclosure of a mortgage. It was bought for John H. Overall, a prominent attorney, for $191,000. It is presumed that he purchased the road on behalf of the bondholders.

TRAFFIC.

Traffic Notes.

The Trunk Line Association has reduced the storage rate of flour at New York from 6 cents a barrel for the first month, to 3 cents a barrel. The rate is now the same for the first and all succeeding months.

The restored passenger rates over the Canadian Pacific, effective Sept. 25, are as follows: From New York to Vancouver, Tacoma, Seattle, Portland, etc., first class, $76.70; second class, $66.70; to San Francisco, first class, $77.50; second class, $66.75. From Chicago to Vancouver, etc., first class, $60.50, second class, $50.50; to San Francisco, first class, $60.50; second class, $50.50. The Canadian Pacific has given warning that if any of the American lines are caught cutting tariff rates it will at once file open tariffs naming rates as low as the lowest cut rate it can discover in effect.

A meeting of the managers of the Western Passenger Immigration Bureau and representatives of Trans-Atlantic steamship lines was held in New York City last week. The Canadian Pacific was invited to attend, but declined to do so until later, when opportunity had been had to see how the new rates were observed. Arrangements were made to continue the delivery by the steamship lines of all immigrant business to the Clearing House for distribution. What effect this will have on the Canadian Pacific remains to be seen. The latter is not a member of the Bureau. It is now securing a portion of this business through independent sources.

Chicago Traffic Matters.

Chicago, Sept. 21, 1898.

The roads of the Central Passenger Association have taken a determined stand against the Chicago scalpers. It has been unanimously agreed that no reduced rates will be made into this city for the peace jubilee celebration, Oct. 18 and 19, unless the City Council passes an ordinance to prevent the scalping of tickets. Certain of the Western roads have agreed to rescind their action agreeing to reduce rates for this occasion and to stand by the Eastern lines in this fight. In no city in the country, probably, are the brokers so strongly intrenched as in Chicago, and the railroads have taken this time to demonstrate to the public the necessity of some measure that will squelch the public's, as well as the railroad's, enemy, the scalper. But the Council has taken no action in the matter yet, and the test of the railroads' courage is yet to come.

No agreement over immigrant rates has yet been reached between the Western lines and the Canadian Pacific. The New York conference was a failure, owing to Mr. McNicol's absence.

The report that the Chicago Great Western had repudiated its agreement with the other Chicago-St. Paul roads on freight rates between the two cities is denied by officers of that company.

Freight rates to the East are again said to be in pretty fair shape. For several weeks they were more or less demoralized, but things seem to have adjusted themselves and there is now little grumbling among the local officers of the Eastern lines. Passenger rates eastbound are not in such good shape. There is considerable underbidding.

Freight rates to Utah have been reduced, the competitors of the Union Pacific having issued new tariffs beginning Sept. 16. They say that the reduction is made to meet secret cutting over the Union Pacific. The reduction does not apply to the first and second classes, but on third class it is from $2.15 to $1.25, and on fourth and fifth it is in about the same proportion. The lettered classes are reduced in a smaller proportion.

The Chicago Car Service (Demurrage) Association has been revived and is said to be now doing good work, though the Chicago Great Western does not participate.

Passenger fares between Chicago and Omaha, Sioux City, St. Paul, Minneapolis and intermediate points are now restored to normal tariff. The restoration, however, does not affect the equalization of through rates via those gateways based on reduced one-way rates in effect between Chicago, St. Louis and lower Missouri River points. The effect on the Chicago-St. Paul rate is an advance from $8 to $11.50.